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Editorial

Extension to Parkeston Quay, Harwich.

The London and North-Eastern Railway have just completed an extension of 1,120 ft. to their Parkeston Quay, Harwich, and this was officially opened to-day, October 1st, by Admiral of the Fleet, Sir Reginald Tyrwhitt, Bart.

The necessity for this extension became apparent in 1930, owing to the large increase in Continental traffic via Harwich, and the Company therefore decided to add 1,120 ft. to the western end of the existing quay. The cost of this extension amounted to nearly £500,000.

The first part of the work, which was started in 1931, necessitated the excavation of 282,000 tons of material in order to obtain the required depth of water. The quay extension, which is 146 ft. wide, is of reinforced concrete and is joined to the land at the western end by two concrete viaducts, one of which carries a single railway track for passenger trains and the other a double track serving the goods lines on the quay.

A two-storeyed transit shed has been erected on the quay extension, this being 900 ft. long, 63 ft. wide and 45 ft. high, and having a floor area of about 2½ acres.

The facilities supplied for the purposes of unloading and loading comprise twelve electric cranes, three of which are of 5 tons capacity and nine of 1½ tons.

An illustrated article giving details of this extension appears on another page, and the Parkeston Quay extension also forms the supplement for this month's issue. It is mentioned on the supplement that the Parkeston Quay, Harwich, is under the jurisdiction of the London and North-Eastern Railway, but the Company are also the owners of the Parkeston Quay.

Annual Meeting of the Clyde Navigation Trustees

The annual meeting of the Clyde Navigation Trustees was held on the 4th September, and the accounts for the year ending 30th June, 1934, were presented, and showed a big improvement, as compared with the previous year.

The revenue amounted to £796,935, which was an increase on the previous year of £63,213. The expenditure side of the account showed an increase of £14,460 over the previous year, the figures being £766,433. There was a surplus revenue therefore amounting to £30,501, as compared with the previous year's debit balance of £18,251.

The increase in revenue was chiefly made up by dues on goods, which increased by £32,909; cranes and hoists, including tramways and capstans, £12,226; tonnage dues on vessels, £9,937; granary, £4,727; animals' lairage, £2,965; and harbour ferries, £2,565. The biggest decrease was shown in graving docks, this amounting to £6,153.

The number of vessels arriving and departing from the port was 24,890, with a tonnage of 13,017,968, as against 24,186 vessels of 12,061,225 tons in the previous year, this being an increase of 704 vessels of 956,743 tons.

The tonnage of goods imported and exported during the year amounted to 6,116,452 tons, this being an increase of 799,387 tons over the previous year, the figures for which were 5,317,065 tons. Imports for the year under review amounted to 2,660,098 tons, and exports 3,456,354 tons.

Southampton Docks.

Although the quantity of shipping tonnage dealt with at Southampton Docks during the month of August did not establish a new record, the month proved a very busy one characterised by many "quick turn-round" trips by liners engaged in cruising activities and on the North Atlantic route. A total amount of nearly four million tons of shipping was handled at the docks during the period referred to.

Continued development has to be recorded so far as the volume of freight tonnage passing through Southampton is concerned and, for the first eight months of the present year the aggregate amount of this traffic revealed an increase of five per cent., when compared with the corresponding period of 1933. A particularly bright feature of this business was an advance of seven per cent. registered in respect of merchandise exported. An examination of the monthly freight returns for the past fifteen months shows that the shipments from the docks have registered a steady appreciation each month throughout that time. There has also been an increase in the quantity of cargo discharged at the docks this year. Grain imports, during recent months, have been considerably heavier. Substantial progress has been made in the banana trade, and this year's importations are almost certain to establish a new record for Southampton Docks. Up to the end of August more than 1,200,000 bunches of bananas had been landed at the docks, representing an increase on the corresponding 1933 figures—which year was itself a record one—of nearly thirty per cent.

The interest of the excursionist and holiday-maker in the big liners at the docks has shown no sign of abatement this year, but on the contrary a big increase has been recorded in the number of persons conveyed on the Southern Railway Co.'s organised rail, road and marine excursions, approximately 50,000 people availing themselves of these facilities up to the end of August last.

Sunderland Corporation Quay,

The new Sunderland Corporation Quay which has been constructed at a cost of approximately £350,000, is to be officially opened on Wednesday, October 10th. Sir John Priestman is to perform the ceremony.

Port of Liverpool.

The Transport Committee of the Liverpool Chamber of Commerce has been asked to consider the question of the cost of laying up tonnage in the Port of Liverpool, with a view to taking whatever action it might be considered necessary, to advocate a reduction in the charges as an encouragement to the industry on Merseyside.

More is likely to be heard in the near future of the proposal that a fish dock should be provided at Liverpool. This proposal was first mooted as a scheme for the relief of unemployment. Two or three years ago the Liverpool Corporation Markets Manager was asked to report on the project, and a consultation took place with the Mersey Docks and Harbour Board, which declined, at that time, to entertain any further capital commitments.

Probably this fish dock proposal will be made a political issue at the municipal election by some of the candidates, who may not be aware of the fact that the Liverpool fish trade is strongly opposed to any change which might saddle them—and the ratepayers—with extra heavy burdens. They are not unmindful of the fact that the London, Midland and Scottish Railway Company has spent millions of pounds at Fleetwood and elsewhere, and, consequently, is not likely to turn a blind eye on any scheme which might result in the diversion of traffic from ports where they have interests. No doubt the Mersey Docks and Harbour Board would readily sell to the Corporation one of the present disused docks. The vital issue is—if a fish dock were provided in close proximity to a new market, excellently equipped down to the last detail, what assurance would there be that trawler traffic would make use of the new facilities. However, for the time being, the matter is in the lap of the gods.

The New Extension to Parkeston Quay

London and North-Eastern Railway

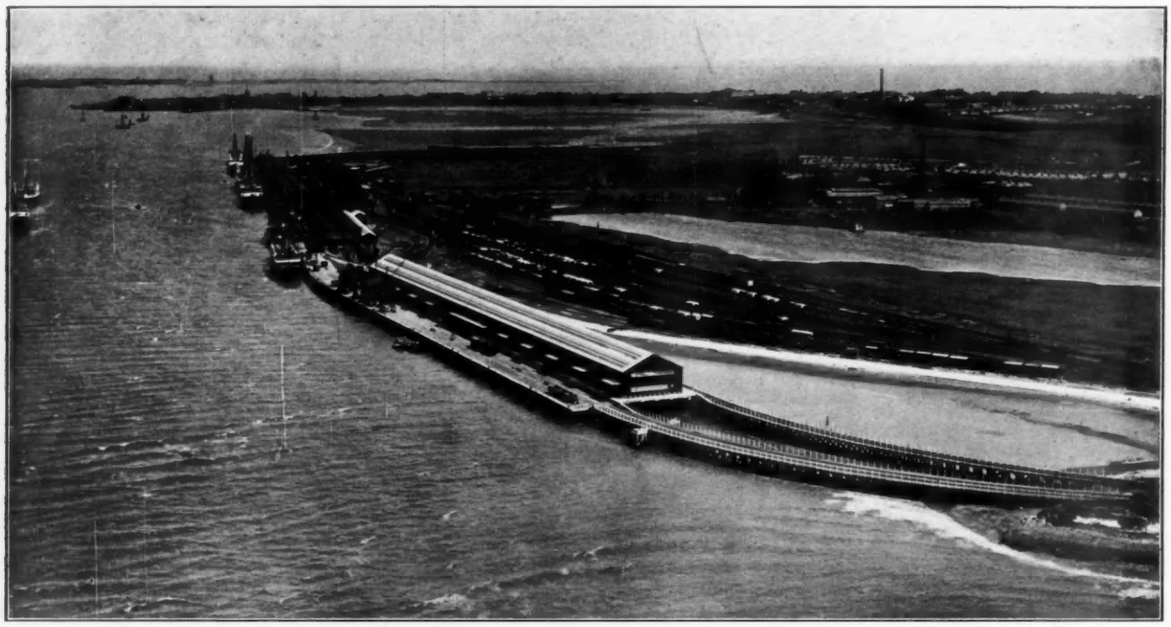


Fig. 1. Parkeston Quay, showing the new Extension in foreground.

Geographical Position.

PARKESTON QUAY is situated in the County of Essex, 68 miles from London and three miles from the sea, on the River Stour, which separates Essex and Suffolk. The short river passage makes the quay very easy of access, and vessels can leave or berth at any state of the weather or tide.

History of Old Quay.

From 1863 to 1883 the then Great Eastern Railway Company maintained Continental steamer services from Harwich, but then, owing to the need for increased accommodation, and following on a dispute with the Harbour Commissioners, a site of some 600 acres of foreshore was acquired about 1½ miles further up the river, and on it was built a quay 1,800 ft. long of iron and timber construction, founded on timber piles and on iron screw-piles. The quay was named Parkeston Quay, after a prominent official of the Railway Company. Between 1906 and 1909 a westward extension for a length of nearly 1,000 ft. was carried out in ferro-concrete. At the amalgamation of the railways in 1922, Parkeston Quay came under the control of the L.N.E.R.

Present Facilities.

At the present time the L.N.E.R. operates from Parkeston Quay night passenger and freight services to the Hook of Holland and Antwerp, and, in the summer, to Zeebrugge. There is also a cargo boat service thrice weekly to Rotterdam, while during the summer season week-end pleasure cruises are carried out in the L.N.E.R. steamer "Vienna." In addition to the foregoing, there are a day boat to Flushing, operated by the Zeeland S.S. Co., and a night boat to Esbjerg by the United Shipping Co. The quay is occasionally used by pleasure cruising vessels of other lines. The L.N.E.R. train-ferry service to Zeebrugge actually operates from Harwich, but the trains of wagons are brought up to Parkeston Quay under seal for Customs examination and for marshalling purposes.

Inception of Present Scheme and General Outline.

For some years preceding 1930, Continental traffic via Harwich developed to such an extent that it became increasingly apparent that the existing facilities at Parkeston Quay would soon become inadequate, and the directors of the Company decided upon an enlargement of the port. Accordingly, plans were prepared for a reinforced concrete extension westward of the existing quay for a length of 1,120 ft. and a width of 146 ft. to provide three additional steamer berths. On this extension is built a two-storeyed transit shed, 900 ft. by 63 ft., which incorporates a passenger station equipped with the usual appurtenances of a sea and river terminal. At the west end of the extension, connection for rail traffic is made with the shore by means of two reinforced concrete viaducts. A length of 450 ft. at the rear of the existing quay has been widened by a width of 14 ft. 6 in. to give room for a roofed-in platform for the Customs examination of train-ferry wagons, and at the same time the goods yard at Parkeston Quay has been enlarged, and seven additional sidings provided, with standage for 387 wagons. A general view of the completed works is shown in Fig. 1.

It is proposed in this article to deal mainly with such of the work as was carried out under Contract No. 1, viz.: the extension and widening of the existing quay, together with the approach viaducts.

Description of Site.

Over the site of the present scheme the foreshore sloped riverwards at about 1 in 50 from the toe of the railway embankment at + 2.00′ O.D. Underlying several feet of very soft silt, the level of which varied locally under the influence of tidal scour by as much as a foot from day to day, was a layer of fairly tough green or brown clay containing an admixture of grit and broken sea-shells. This extended to about —25.0′ O.D., where it gave place to a bed of shingle averaging 20′ 0″ in thickness. Beneath this was stiff blue clay. Mean H.W.O.S.T. at Parkeston Quay was given as +7.91′ O.D., and mean L.W.O.S.T. as —3.59′ O.D. The highest tide level experienced during the construction of the works was about + 10.0′ O.D., and the lowest about — 5.5′ O.D.

Main Quay Extension (Description).

As can be seen from the Supplement, the straight portion of the new quay makes an angle, of 9° 8′, with the old work, the connection between the two straights being effected by a curve, of 1,323 ft. radius, measured to the face line. The East end of the new quay is consequently somewhat irregular in plan, as in addition it fits into the angle between the end of the old quay and the old approach viaduct.

The new quay is built as a series of trestles placed transversely and connected at their tops by the decking and deck beams, and at a lower level by bracings in a horizontal plane. Outlines of typical trestles are shown on the Supplement. In general, the trestles are spaced at 12 ft. 6 in. centres, those of the "Main" type alternating with the "Intermediates." Over the curved portion of the quay the trestles are pitched 12 ft. 6 in. apart on the front row of piles, but are disposed radially to the curve of the face line. Up to the 23rd trestle from the East end, the trestles depart from the normal at their inner ends, to varying extents as determined by the width of the quay; also, Eastwards of trestle 17, the decking is all at the lower level. Expansion joints divide the quay into four parts, the Westernmost three of which are substantially alike. Next to the expansion joints the trestles are adaptations of the "intermediate" type, spaced at 5 ft. centres, the adjacent bays being reduced to 10 ft. so as to maintain the 25 ft. spacing of main trestles throughout the quay.

Parkeston Quay Extension, Harwich—continued

Parkeston Quay Extension. View of West End of Quay taken from bottom of Customs Boathouse Slipway. September 1st, 1931.

Piles.

The piles in the front four rows are of 16 in. by 16 in. section reinforced with 4 bars $1\frac{3}{8}$ in. dia., while the remainder are 14 in. by 14 in., also with 4 bars $1\frac{3}{8}$ in. dia. In the front row of each main trestle is a pair of 16 in. by 16 in. piles pitched 16 in. apart. The columns supporting the shed stanchions also occur in the main trestles, and are each supported by a pair of 14 in. by 14 in. piles 16 in. apart. All the piles were made in lengths of 38 ft. 6 in. or 40 ft., and were driven to a specified set of 1 in. on the last 15 blows from a 3-ton monkey falling through 2 ft. 6in. After driving, the pile heads were stripped down to the level of the underside of the bottom bracings, and the reinforcing bars left projecting to lap 2 ft. 6 in. with the bars of the column continuations. In the case of the few piles which had been driven lower than the required level before showing the specified set, advantage was taken of extra low tides to cut the heads down to give the correct laps, and the column bars were extended accordingly with special gussets between the piles and the underside of the bottom bracings.

Cylinders.

After the twin piles at the front of each main trestle had been driven, they were surrounded by a pre-cast concrete cylinder 6 ft. outside diameter, and 6 in. thick, fitted with a steel cutting edge and bedded in the clay or ballast of the river bed. The space between the cylinders and piles is filled with concrete, and the whole made monolithic with the junction of piles and bracings. A bracket formed in the concrete at each cylinder head provides an attachment for the lower end of the fendering. Photograph No. 4084 shows the upper part of one of the cylinders, with the column continuation and adjacent bracings under construction. In the design, no account was taken of the value of the cylinders in supporting the front of the quay, their function being to tie the piles together and to provide additional mass available for the absorption of the energy of impact of vessels coming alongside the quay.

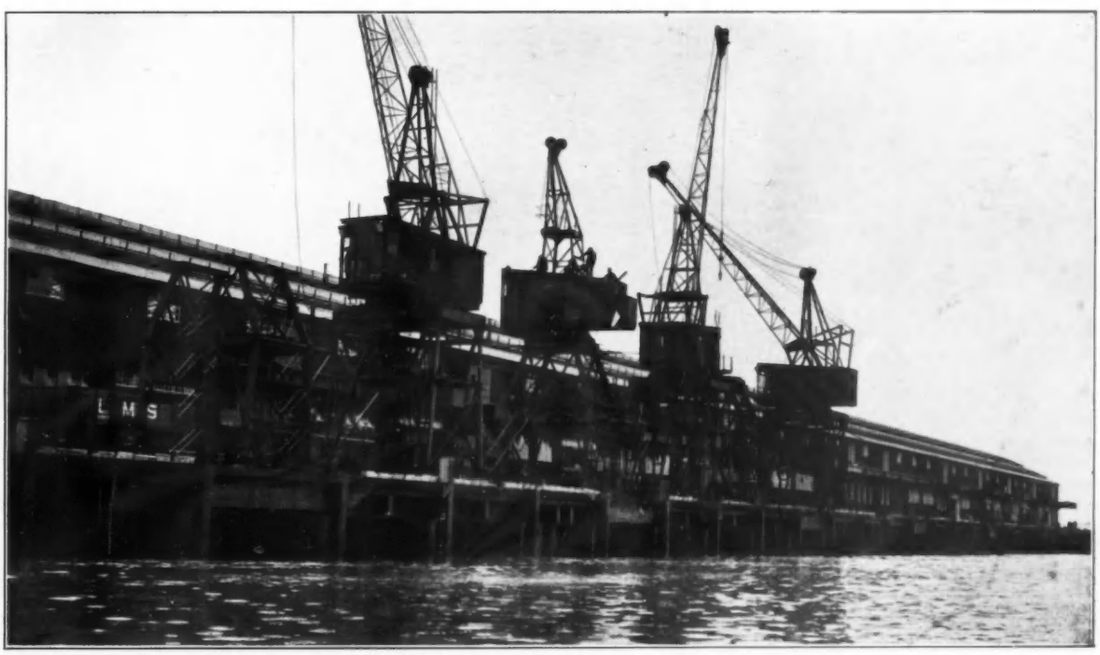
Horizontal Bracings.

The undersides of the lower bracings are at — 1.00′ O.D., except at the rear of the quay, where the level was raised to + 1.50′ O.D. in order to clear the very soft top layers of mud on the foreshore.

The general system of horizontal bracing is indicated by the part plan Fig. A. (Page 355). Each section, into which the quay is divided by the expansion joints, is stiffened at the middle by diagonal bracings in two adjacent bays across the whole width of the quay.

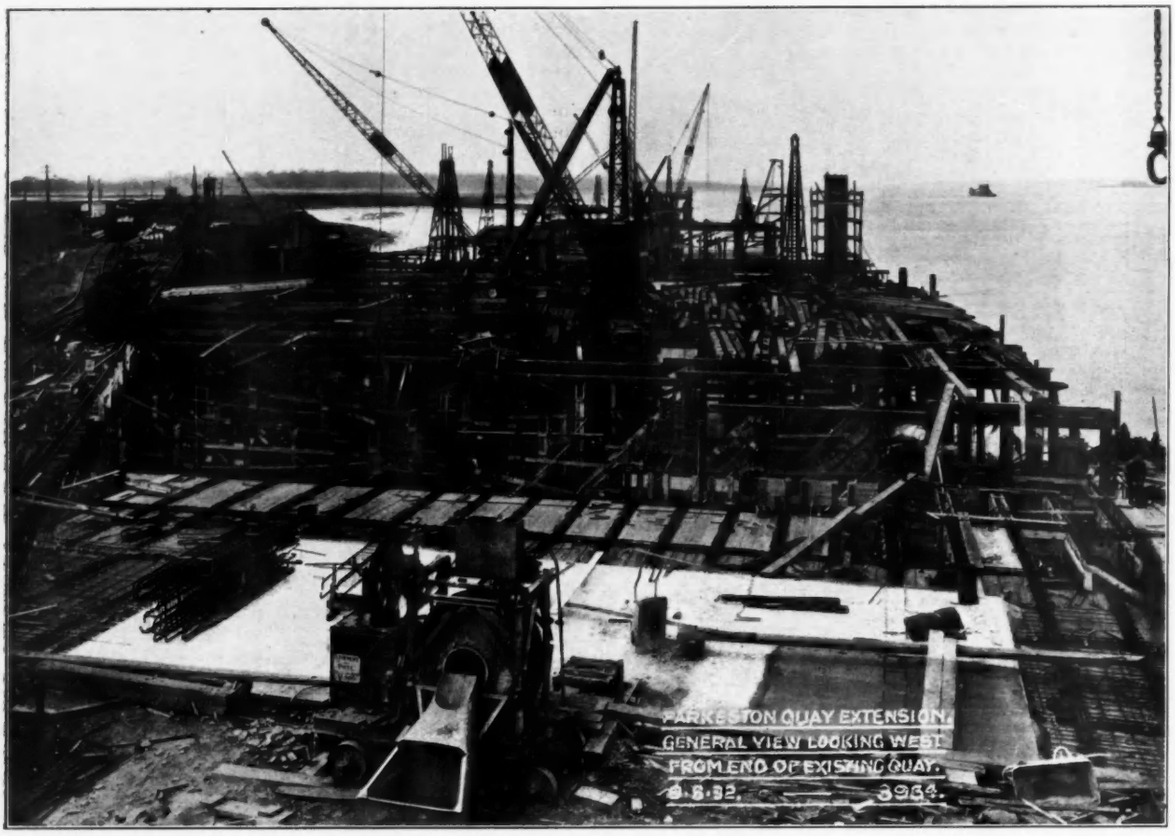
Columns.

The columns which rise from the cylinders at the front of the quay are 48 in. by 16 in. in section, reinforced with 8 bars $1\frac{1}{4}$ in. dia. The columns under the shed stanchions are 14 in. wide and 25 in., 28 in. and 22 in. deep, according to the load coming upon them. The vertical reinforcement consists of 8 bars $1\frac{1}{8}$ in. dia., and heavily reinforced caps are provided to which the stanchion bases are bolted. The remaining columns are of the same section as the piles of which they are continuations.

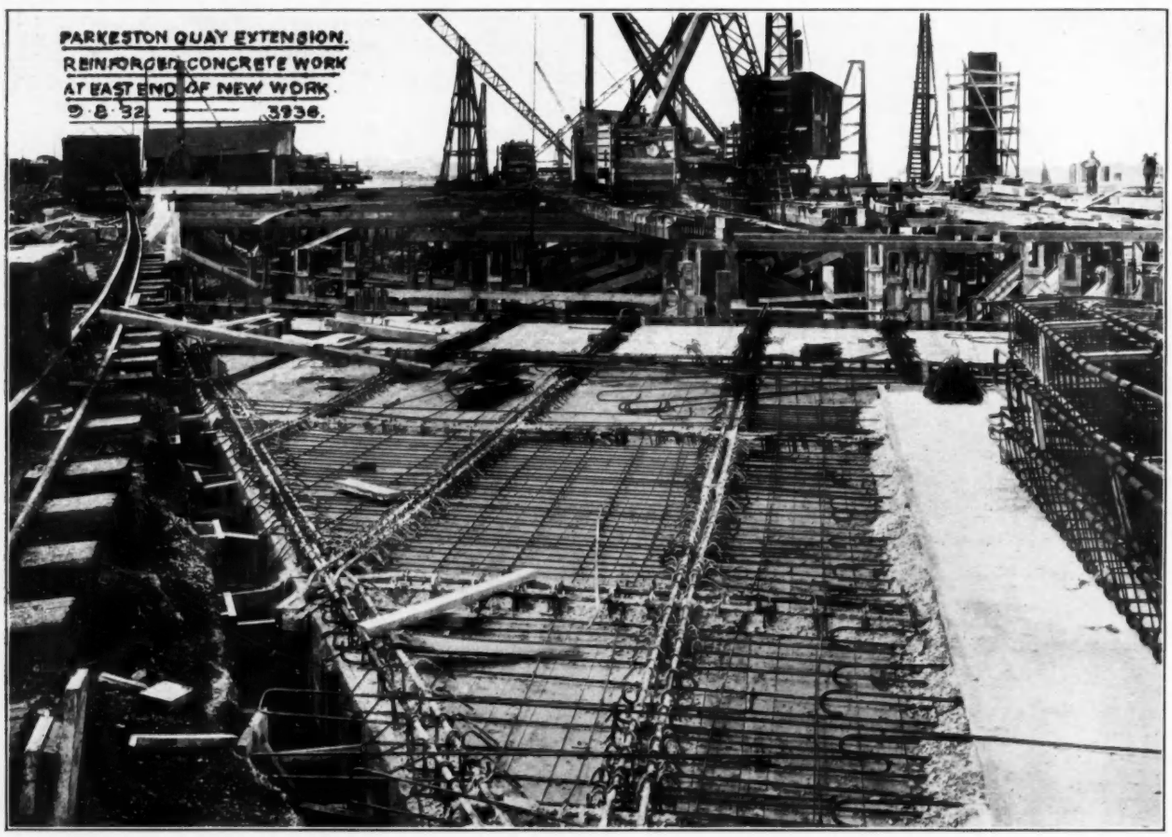


Parkeston Quay Extension. Part General View of the Quay from the River.

Parkeston Quay Extension, Harwich



Parkeston Quay Extension. General View looking West from end of existing Quay. August 9th, 1932.



Parkeston Quay Extension. Reinforced Concrete Work at East End of New Work. August 9th, 1932.

Parkeston Quay Extension, Harwich—continued

Rakers.

Diagonal bracings, all 14 in. by 12 in. section, are provided in the plane of the trestles under the low-level deck on both sides of the quay. The columns under the centre row of shed stanchions have similar bracings, which serve to distribute part of the load on to the piles in the adjacent rows. In the middle of each section between expansion joints, longitudinal rakers are provided in two adjacent bays right across the quay.

Parkeston Quay Extension. Looking West from Crane at end of existing Quay. January 4th, 1933.

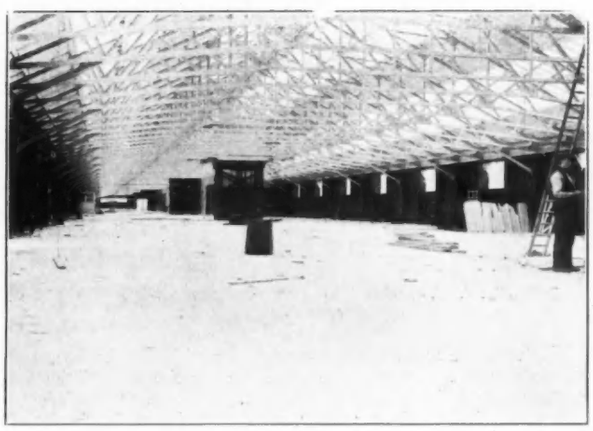
Decking.

Practically all the decking is of beam and slab construction. For descriptive purposes, it will be convenient to imagine the quay divided into three parts transversely, and to consider each of these separately, according to the function which it fulfils.

Front Lower Deck.

The front lower deck, 46 ft. wide, forms the quay proper, and carries three lines of railway track and a set of three 5-ton and six 30-cwt. electric portal cranes, with level-luffing jibs, which span the outermost road on crane tracks of 15 ft. gauge. The top of the deck slab is at + 13.79′ O.D., but above this are 14 in. of clean shingle and 4 in. of tarmacadam to give a traffic surface at rail level, 14.87′ O.D. The face line of the decking is 3 ft. beyond the centre-line of the cylinders.

The deck slab is 6 in. thick, and was designed for a loading on the railway tracks equivalent to 18 B.S. units of loading corresponding to 1,000 lb. per sq. ft., in addition to dead load. Under the outer crane track a width of 4 ft. is thickened to 10½ in. The transverse beams in the line of the trestles are 13 in. wide and 2 ft. 9 in. deep in the front span and are cantilevered out at the front columns to form brackets for the fendering; over the remaining spans they are 13 in. wide and 2 ft. deep. The



Parkeston Quay Extension. View of Upper Floor of Shed, showing Electric Hoists.

front longitudinal beams, spanning between the front main columns, and carrying one end of the transverse beams which frame into them from the intermediate trestles, are the heaviest structural members in the work, being 14 in. wide and 3 ft. deep; the tension reinforcement at mid-span consists of 6 bars 1⅝ dia., while over the supports there are 6 bars 1⅜ dia., and 6 bars 1 in. dia. The remaining longitudinal beams, spaced at about 4 ft. centres, are, in general, 9 in. by 13 in.

A 2-in. gap is left in the decking at the expansion joints and is covered by 7 in. by ½ in. wrought iron cover plates lying in rebates formed to receive them. At the face of the quay there is a kerb, 1 ft. 6 in. high above the deck slab, and 8 in. thick, which forms the outer wall of a cable duct 2 ft. wide. The inner wall is of brickwork 9 in. thick and 4 courses high surmounted by a rebated kerb cast in situ. Pre-cast slabs cover the duct. At intervals along the quay the floor of the cable duct is dropped 2 ft. to form a pit 23 ft. 8 in. long for the reception of the crane plug-boxes. The deep front wall of the pit is strutted near the top from the front longitudinal beam. Seven electric capstans for the movement of wagons are provided on this part of the quay, and they are housed in pits formed partly by lowering the decking 2 ft. over an area 9 ft. 6 in. by 4 ft., and partly by raising a kerb to rail level. Blocks 2 ft. 6 in. square and 1 ft. 6 in. high cast integral with the deck-slab, form seatings for the 22 fairleads required for use in conjunction with the capstans. The rails of the crane tracks are of 100 lb./yard F.B. section, and 6 in. by 3 in. angle guards are provided to form a flange gap for the crane wheels between the rail head and the tar paving. It was originally intended to lay these on timber waybeams, bolted to the decking, on which two continuous pads were formed, 3 in. thick and 1 ft. 9 in. wide, to serve as seatings, with holes through the pad and slab for the holding-down bolts. Finally, however, the waybeam was made of lightly reinforced concrete, bolted to the decking but cast in situ. The heads of the holding-down bolts, inside the waybeam, are fitted with washer-plates and are linked together in pairs. Of the 10 bollards provided in the quay face, eight are of the "Bean," patent type, and are bolted to heavily reinforced bases formed over the front columns. The other two are to the L.N.E.R. standard pattern. Drainage of the front of the quay is accomplished by means

Parkeston Quay Extension. View from East End of Quay, showing Electric Cranes.

of specially designed pre-cast tubes in the form of hollow truncated pyramids, which stand over 2 in. bore drip pipes through the deck slab. The tubes are made a little less in height than the general surface of the tar-paving, which is finished to give a fall towards them, and at their tops they are fitted with 3½ in. by 3½ in. grids. Fig. 2 shows the front of the quay with the permanent way and ballasting complete, but before the laying of the tar paving.

Fendering.

The fendering at the face of the quay consists of 16 in. by 16 in. vertical timbers of Australian brush box, on the end of each main trestle, fastened at top and bottom by means of wrought iron straps and cleats to the concrete brackets already mentioned. The faces of the fenders have spiked to them wrought iron rubbing plates, ½ in. thick, while the exposed upper ends of the timbers are protected from the weather by caps of 16-gauge zinc. Each alternate fender is extended 3 ft. above finished deck level to obviate any possibility of vessels overlapping the quay at exceptionally high tides. Between the fenders runs a continuous blocking of 12 in. by 12 in. creosoted pitch pine bolted to the front kerb.

Upper Deck.

The upper deck, at level 18.50′ O.D., is 87 ft. wide, and extends westward from trestle 17 throughout the remainder of the quay, with a total length of 920 ft. It forms the lower floor of the transit shed, which, however, occupies only 63 ft. of the total width. A strip 10 ft. wide on the riverward side, outside the shed, serves as a platform for the loading and unloading of wagons from the adjacent siding. On the landward side of the shed is the passenger platform, 14 ft. wide. Communication between the upper and lower decks is by means of two

Parkeston Quay Extension, Harwich—continued

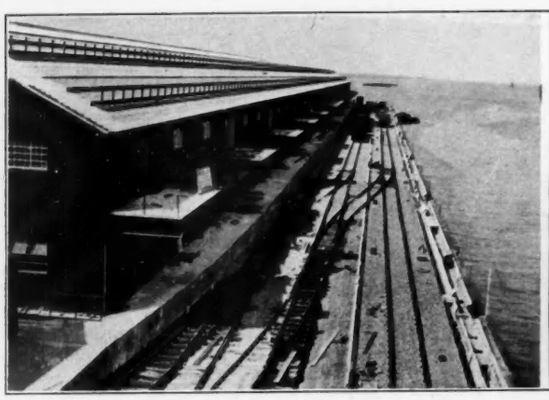


Fig. 2. Front of Quay, with the Permanent Way and ballasting complete, but tar paving not yet commenced.

Fig. 3. View looking Westward along the back of the Quay.

ramped ways formed in the decking about 100 ft. apart on the north side of the shed. At each place one ramp, 24 ft. wide, leads directly into the interior of the shed at a slope of 1 in 7½. At right angles to this, a side ramp, 10 ft. wide, also sloped at 1 in 7½, gives access to the outside goods platform. The eastern ends of the platforms outside of the building, lead down to the lower deck by means of ramps constructed as reinforced concrete slabs supported on longitudinal brick walls. The upper deck slab is designed for a loading of 3 cwt. per sq. ft., and is 4½ in. thick, inclusive of ¾ in. granolithic surfacing. The main beams on the lines of the trestles are 9 in. by 18 in., reinforced according to their span, and the longitudinal secondary beams, at 5 ft. centres, are 7 in. by 10 in., with a main tension reinforcement of four ¾ in. dia. bars. The provision of beams to support the main ramps would have been a rather complicated matter, and so the ramps are designed as slabs spanning in two directions between the lines of columns, the thickness of the slab being increased to 6 in. over the area concerned. The largest panels are 15 ft. 3 in. by 12 ft. 6 in., reinforced with ½ in. dia. bars at 6 in. centres in both directions.

At six points along the centre line of the shed, pits are formed to accommodate the electric lifts which operate between the shed floors. The 2 in. expansion gaps in the upper deck are covered by 7 in. by ½ in. wrought iron chequer-plates, lying in rebates 9 in. wide, formed in the slab. The plates are screwed along one edge to lugs built into the concrete, and the remaining width of the rebate is run in with a bitumastic filling. The goods platform is drained by giving it a slight fall to its outer edge, while the passenger platform is drained by means of a continuous cast iron grating, 5½ in. wide, along the centre line. The West end of the upper deck, which extends beyond the shed for 10 ft. at either end, is fenced across. Photograph No. 4222 shows the underside of the upper deck, with the bottom of a hoist pit visible on the left of the illustration.

Passenger Road.

On the landward or South side of the passenger platform is the single track for passenger traffic. This is carried by a strip of lower decking, 15 ft. wide overall, the top of the slab being at 14.00′ O.D., with rail level 15.50′. No tar paving is provided. The slab is 6 in. thick, designed for a loading equivalent to 18 B.S. units, plus an addition for impact, and the dead load. The transverse beams are 12 in. by 38 in., and are cantilevered 3 ft. beyond the line of the rear row of columns. The longitudinal beams, spaced at 3 ft. 10 in. centres, are 9 in. by 13 in. Fencing, consisting of reinforced concrete posts 4 ft. 9 in. high, at 6 ft. 3 in. centres, with three rows of galvanised gas-tube railing, is continuous along the South side of the passenger track; the posts are bolted to a kerb, 1 ft. 6 in. high and 6 in. thick, which serves also to retain the ballast. Four capstans are provided on this side of the quay, housed in pits of the same type as on the North side. The pits are located between adjacent trestles, and clearance from the track is obtained by placing the pits outside the general kerb line, the main beams being cantilevered 7 ft. 3 in. for this purpose. The arrangement is clearly shown in Fig. 3, which is a view looking Westward along the back of the quay. Six fairleads are provided in the passenger road, on seatings cast integral with the kerb and deck-slab. Drainage is effected directly through 2-in. bore drip-pipes, and the covers to the expansion joints are as on the front of the quay.

Between Trestles 17 and 18 the slab under the passenger road slopes down to 14.79′ O.D., so that Eastward of Trestle 17 the decking is all at the one lower level right across the quay. Part of this area is occupied by a mess-room for the quay workers, while the remainder of the space is occupied by the various connections between the railway tracks, and being tar-paved, forms a general circulating area.

Between the columns supporting the edges of the upper deck are built blue-brick panels, to fill the gap which would otherwise remain between the two deck levels.

Main Quay Extension (Construction)—Dredging.

Before the commencement of the main works the site was dredged over to give a minimum depth at low water of 20 ft. at the face of the quay. This involved the removal of 282,000 tons of material, which was taken out by bucket dredger and pumped a distance of nearly half a mile through a 2-ft. diameter pipe to fill a shallow lake on the landward side of the railway embankment.

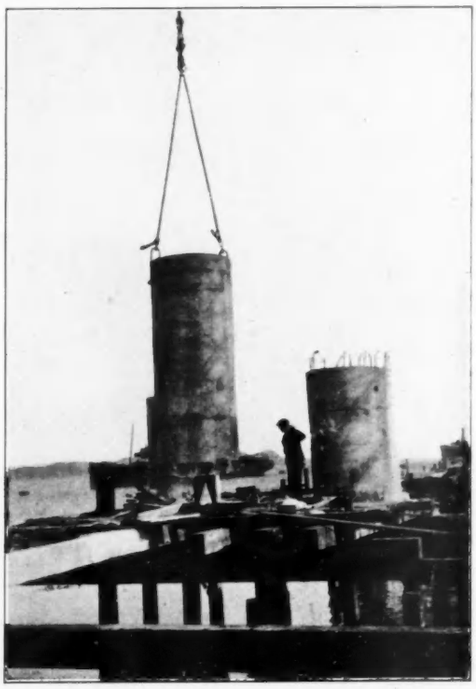
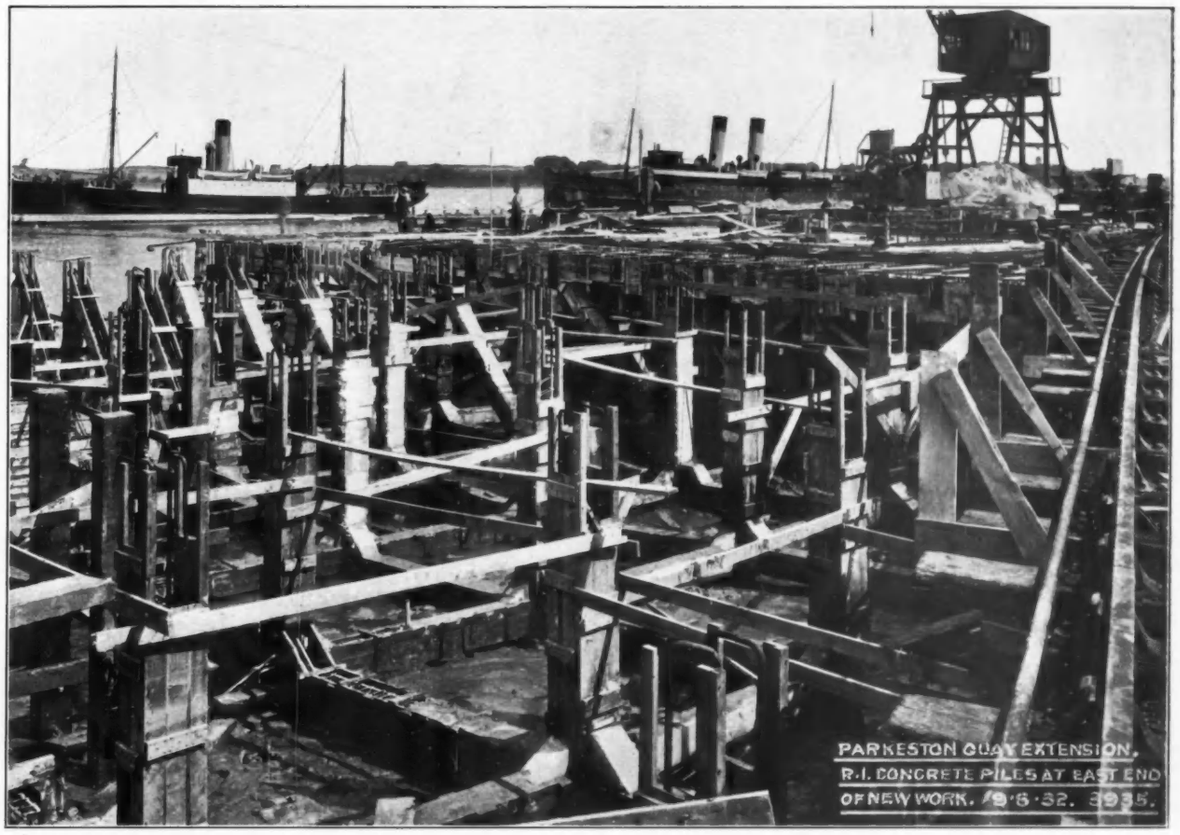


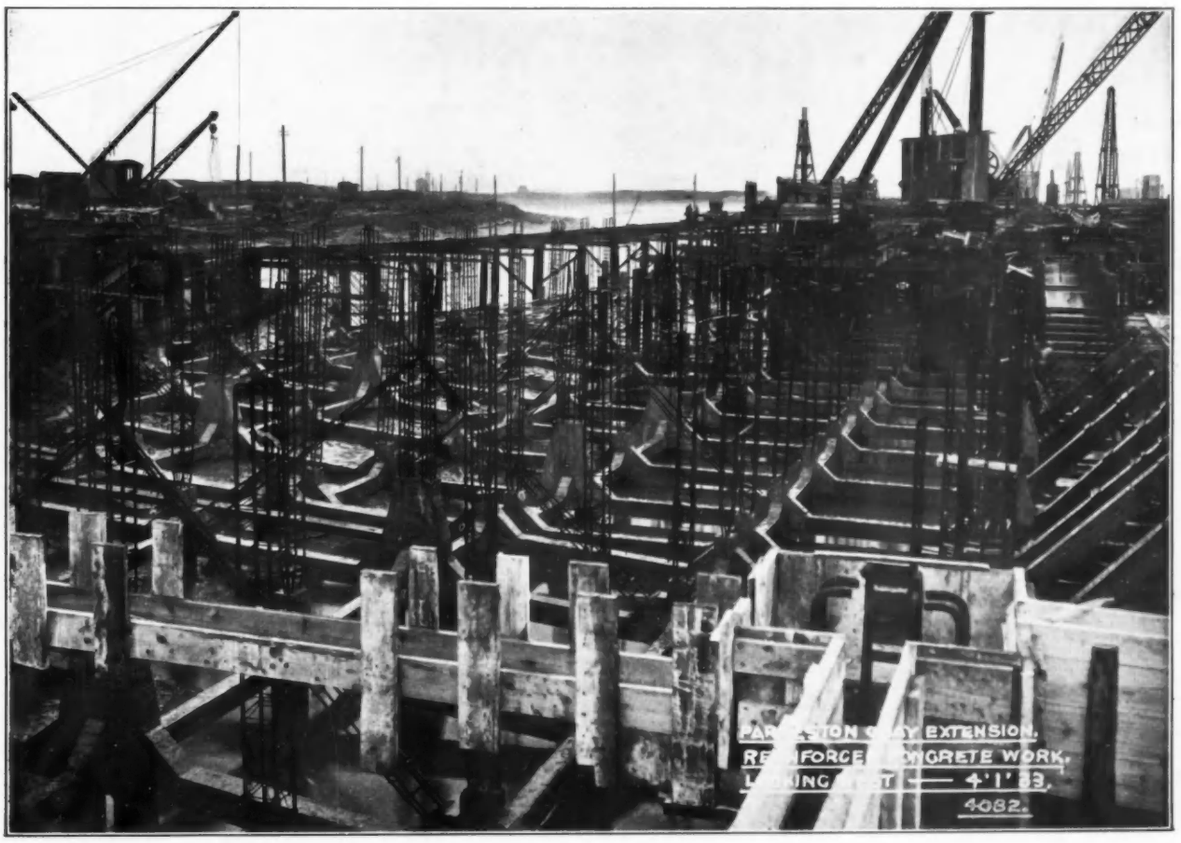
Fig. 4. Lowering into place the lower portion of a cylinder cast in two parts.

Work on the main extension commenced in November, 1931. At the outset the only space available for the use of the Contractors was a limited area of 150 ft. by 40 ft. at the Western extremity of the existing quay, and some ingenuity had to be exercised in the disposal of plant and materials. A steam derrick crane, with a 90 ft. jib, was erected on this space, and handled the material for the first part of a timber staging, raised well above high-water mark, the piles for which were driven from a frame mounted on the stern of a barge. When sufficient staging had been thus erected, the crane was moved forward on to it, and the staging increased in size to take two more cranes. Subsequently, a second staging was commenced about two-thirds of the way along the new quay. The timber for this was floated out behind the pile-barge, which not only drove the piles but also placed sufficient capsills to enable the erection of a small hand crane which, in its turn, erected the

Parkeston Quay Extension, Harwich



Parkeston Quay Extension. Reinforced Concrete Piles at East End of New Work. August 9th, 1932.



Parkeston Quay Extension. Reinforced Concrete Work, looking West. January 4th, 1933.

Parkeston Quay Extension, Harwich—continued

Fig. 5. North Viaduct.

Fig. 6. South Viaduct.

first of the two steam derricks worked on this staging. At first the outer staging was an island site, and all material, including the concrete piles for the permanent work was floated out on barges. In due course, the two stagings were connected to one another and to the shore at the East end of the job by a gantry on the South side, carrying a standard gauge track for hand-propelled bogies. Eventually the gantry extended for practically the whole length of the quay and approach viaducts. The stagings occupied the full width of the quay, and care, of course, had to be taken in setting them out to clear the permanent work. The first part of the outer staging was, of necessity, set out by means of two theodolites. As the driving of the permanent piles proceeded, the rear of each staging was dismantled and re-erected ahead, only a skeleton framework being left behind for the support of the reinforced concrete work during construction. This remaining staging was, in its turn, dismantled before the cranes had moved out of reach. At one period there were 50,000 cu. ft. of baulk timber in the stagings and access gantry. Photograph No. 4084.

Fig. 7. Dolphin at West End of Quay.

Piling.

1,124 concrete piles were required in the main quay and 310 in the rest of the works. After a few trial piles had been made and driven, casting commenced in earnest in February, 1932, on a level plot of ground to the rear of the existing quay, and continued at an average rate of two batches of 14 piles each per week. The piles were handled from beds to site by a 5-ton steam locomotive crane. Piling was carried out from the temporary staging by means of 3-ton B.S.P. semi-automatic, single-acting steam hammers working on timber frames fitted with sliding leaders. It was found, in general, that once resistance to driving had been established, the penetration per blow was of the order of $\frac{1}{4}$ in. for a considerable period, and then shortened suddenly, a set of $\frac{5}{8}$ in. or $\frac{3}{4}$ in. on 15 blows, well within the requirements of the specification being obtained almost immediately. About a dozen piles in various parts of the quay went below the required level before attaining the specified set, or showed signs of doing so. By suspending driving and re-commencing after a varying period of days, no difficulty was experienced in attaining the set; in fact, it seems not unlikely that the further penetrations obtained were only apparent, and due rather to compressions in the pile helmet and dolly than to actual movements of the piles. A point of interest in connection with the driving of the twin piles is that in a number of cases, contrary to expectations, the second pile of the pair went in deeper than the first.

Cylinders.

The pre-cast cylinders for the front of the quay were concreted on the staging, near their final position. They were cast 24 ft. long, those up to Trestle 29 in one length; beyond that the cranes available for placing them were of insufficient capacity, and they were cast in two lengths of 15 ft. and 9 ft., with a rebated joint. The procedure adopted for sinking them was as follows:—When the two 16 in. by 16 in. piles had been driven, the silt from round them was grabbed out until the nature of the material brought up indicated that a clean bottom had been obtained. Three timber guide piles were then driven on the periphery of a circle representing the cylinder, and after a diver had examined the bottom to make sure that there were no obstructions and no " pot-holes " left after grabbing, the cylinder (the bottom 15 ft. portion in the case of those cast in two parts) was lowered between the guide piles (Fig. 4), and bedded in the clay, either by repeatedly raising it and dropping it through a few feet or by judiciously hammering it with a long timber dolly. The diver again examined the bottom to see that the cylinder was bedded evenly. In the case of the cylinders in two parts the sinking of the upper portion followed, the diver inspecting the joint for evenness of seating. After concrete in small bags had been dropped into the cylinder to seal the bottom, a small compressed air-driven pump was let down and run till the clearness of the water discharged showed that all remaining silt had been removed. Twelve $1\frac{1}{4}$ in. dia. reinforcing bars to the hearting were then fixed in position, and the concrete hearting placed, under water, through a tremie. This operation occupied several successive low tides. Eventually the top of the cylinder was shuttered round and the whole continued solid up to bracing level.

Formwork and Concreting.

Work on the lower bracings could, of course, proceed only at low tide, and was carried out both by day and night. About four hours were available for concreting per tide, and often as much as an hour of this time was taken up in washing out of the shuttering and from the reinforcement the thick deposits of silt left by the receding tide, particularly in calm weather. In the summer months some difficulty was experienced in dislodging from among the reinforcement small crabs, the colour of concrete, which swarmed in multitudes in the shallower water. Under unfavourable combinations of wind direction and tidal phase, the tide failed to go below bracing level, but fortunately these occurrences were not frequent, and even then it was usually possible to work on the raised bracings at the back of the quay. The weight of the wet concrete in the bracings was carried by wire-rope slings from the temporary staging. The concrete was mixed on a barge alongside the work and distributed along barrow-runs over the bracing boxes. The lower ends of the columns and rakes were concreted at the same time as the horizontal bracings. (Photograph No. 4223). By the time the column and raker shuttering, beam boxes, and deck slab centering had been fixed, the reinforced work was self-

Parkeston Quay Extension, Harwich—continued

supporting, and the columns and rakers were concreted from deck level, being brought up in one lift to the level of the beam haunches. Next, the beams below the decking were concreted, the boxes being propped from the already completed bracings beneath. Finally, the deck slab itself was concreted. On the upper deck the surface of the slab, after screeding, was well roughened while still wet, and the laying of the granolithic surfacing followed, sometimes immediately, but never more than 24 hours after. Timber formwork was used throughout, with the exception of the metal forms for the outside of the pre-cast cylinders.

Crane Rails.

In laying the crane tracks, a special " modus operandi " had to be evolved. When the waybeam reinforcement and holding-down bolts had been fixed in position, the side-shuttering was erected with pairs of slots cut in its upper edge every few feet to pass well-greased 1 in. by 1 in. iron bars, the ends of which rested on wooden blocks standing on the deck slab on either side of the waybeam. On these bars the Railway Company's platelayers assembled the 100 lb. F.B. crane rails and the guard angles, the holding-down bolts being left hanging down into the waybeam boxes. The rails were brought to level by manipulation of wedges under the supporting bars. Their alignment was a somewhat irksome business, particularly on the curved portion of the quay, as the supporting bars did not offer much restraint to lateral movement. The correct spacing of the rails and of the guard angles from the rails was achieved by means of fairly closely spaced gauges of 9 in. by 3 in. timber, with projecting strip metal " teeth " which fitted between the angles and the rail heads. With the gauges in position the effect was that of a 15 ft. deep girder, with the rails as flanges and the gauges as web, which offered considerable resistance to bending, so that it was necessary to align one rail, strutting it sideways where required, and then to bring the other rail to it by means of the gauges, care being taken not to disturb the first rail in the process. The waybeam concrete was poured to just above the level of the rail bottoms, and finally, after the concrete had taken its set, the 1 in. by 1 in. bars were withdrawn and the holes left by them filled with cement mortar.

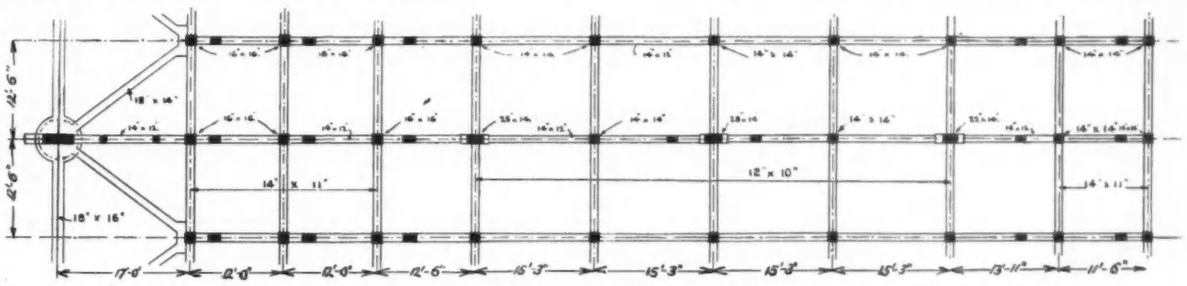


Fig. A. Plan of Main Quay at Lower Waling Level.

Viaducts.

The North Viaduct (Fig. 5), 27 ft. wide and 537 ft. long, is built on a curve of 10 chains radius, and carries two tracks serving the goods roads on the front of the main quay. It is built as a series of trestles, an outline of one of which is given in Fig. B. The three trestles nearest the main quay carry cantilevered brackets which support the timber boat stairs leading down to low water level from the end of the quay. The design loading is 18 units of B.S. loading and the deck slab is 6 in. thick, with main transverse beams 12 in. by 24 in. and longitudinals 9 in. by 13 in. spaced at 3 ft. 10 in. centres.

South Viaduct.

The South Viaduct (Fig. 6), 16 ft. wide and 498 ft. long, has a radius of 11½ chains and carries the single-line passenger track. The outline of a typical trestle is given in Fig. C. The decking, designed for the same loading as that carrying the passenger track in the quay, consists of a slab 6 in. thick with 12 in. by 26 in. transverse beams and 9 in. by 13 in. longitudinals spaced at 3 ft. 10 in. centres.

Features Common to Viaducts.

The viaducts have several features in common. The trestles are spaced at 12 ft. 6 in. centres measured round the centre line of the curve, and are disposed radially. Each viaduct is divided into two sections by an expansion joint midway, and expansion joints are provided next the main quay. The middle of each section is stiffened over four bays by diagonal bracings in the horizontal plane and by longitudinal rakers. At the inner ends of the viaducts narrow ramps, raised on concrete cross-walls, communicate with the end of the upper deck of the quay. A ballast kerb and fencing similar to those along the passenger road are provided on both sides of each viaduct. The ballast under the tracks finishes at sleeper level and drains through 2 in. bore drip-pipes in the slab. Plain cover-plates in rebates are provided at the expansion joints.

The viaducts were constructed concurrently, on the lines already described for the main quay, and each stage in their construction followed on the completion of the corresponding stage in the main quay. The piles varied from 37 ft. to 43 ft. in length.

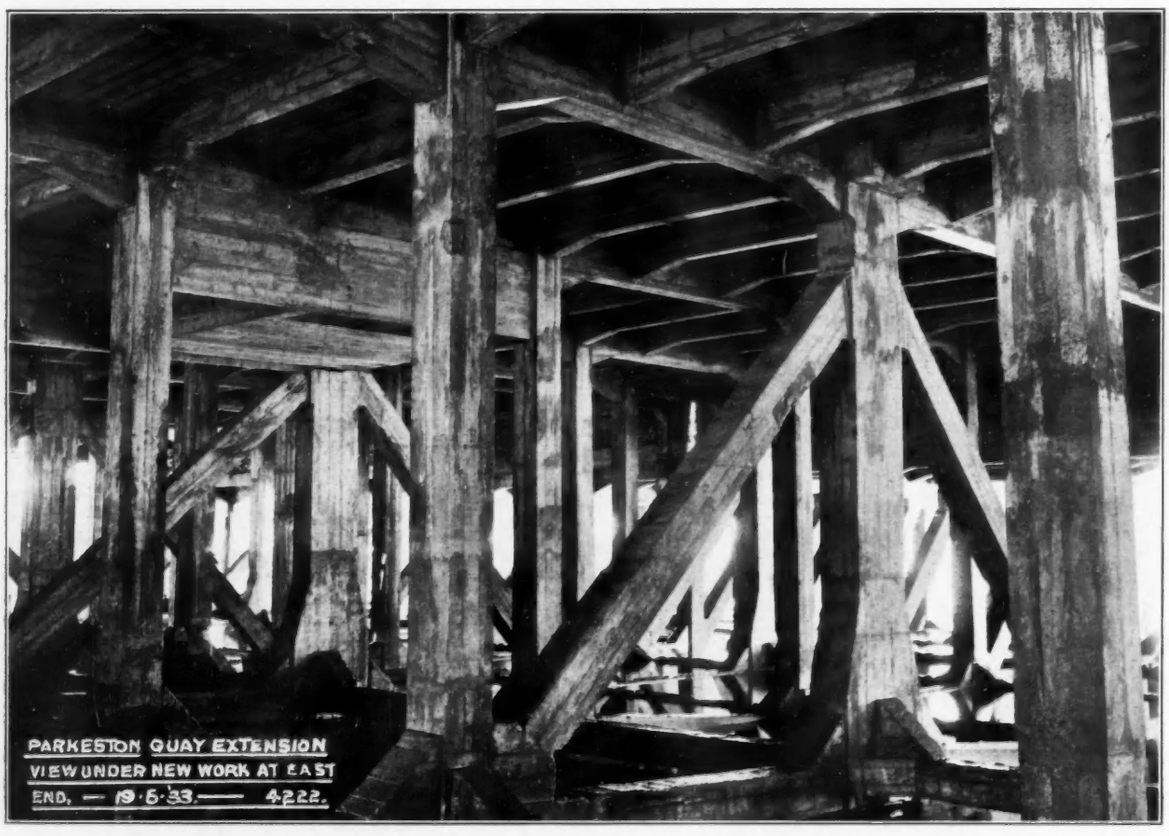
Viaduct Setting-out.

A note on the setting-out of the viaducts will not be out of place here. The setting-out of the main quay was relatively simple. Along the edge of the marshalling yard a base line was laid down from which lines could be turned off square to the face line of the work, and two sighting lines, parallel to the face line, were established—one at the back and one at the front of the quay. From the outset it was apparent that it would be a practical impossibility to set out the viaduct curves by any of the usual methods of curve location. Not only was the rigidity of the temporary staging insufficient to permit the use of an instrument on it with any degree of accuracy, but it was foreseen that as the work proceeded, plant and materials standing on the decking would prove serious obstacles in the line of sight. Neither was it possible to set out from the shore end, as at first there was a stretch of open water between the approach bank and the work under construction, while further, the end of the approach bank was subject to considerable movements due to settlement. A suggestion was made to set up at the centres of the curves and turn off subtension angles, but a rough survey showed that the centres were located in a low-lying marsh on the far side of the railway line and that it would have been necessary to construct a staging to raise the line of sight of the instrument above the embankment. The method finally adopted, though crude, was effective. The main base line in the goods yard was extended, to a total length of nearly half-a-mile, and three station points established in it. From these were set by triangulation the centres of every eighth trestle in either viaduct, i.e., the extremities of 100 ft. arcs or 99 ft. 11 in. chords. Theoretically two stations were sufficient, but a third was used as a check. On each line of sight two nails were fixed in the temporary staging a few feet on either side of the approximate position of the trestle centre. String lines between the three pairs of nails should, of course, have intersected in a common point, as indeed they did in many cases. In no case, however, did a side of the resultant triangle exceed more than an inch or two in length, and the mean position of the trestle centre was taken as the centre of the inscribed circle of the triangle. After the position of the point so obtained had been checked in relation to the previous eight-bay segment, the centres of the intermediate trestles were set out by mid-chord offsets, and marked by 6 in. nails driven into the timber staging, which was carefully maintained at a constant level over the area of the viaducts. For pitching the battered piles, templates of light boards were prepared, with holes bored through them to fit over the nails representing adjacent trestles. With the template in position, extensions on its outer corners gave directly the position of the top pile guides; the bottom guides were then set by plumbing down and measuring out horizontally an appropriate distance. When the deck shuttering had been fixed, the centres of trestles were set out again by a repetition of the foregoing method. For the kerb line, no template was necessary, as from each centre nail half-widths were set out on either side along the line of the trestle, and the kerb shuttering was run in a smooth curve between the points so obtained.

(continued on page 366a)

Parkeston Quay Extension, Harwich

Parkeston Quay Extension. One of the Main Outer Piers. January 4th, 1933.

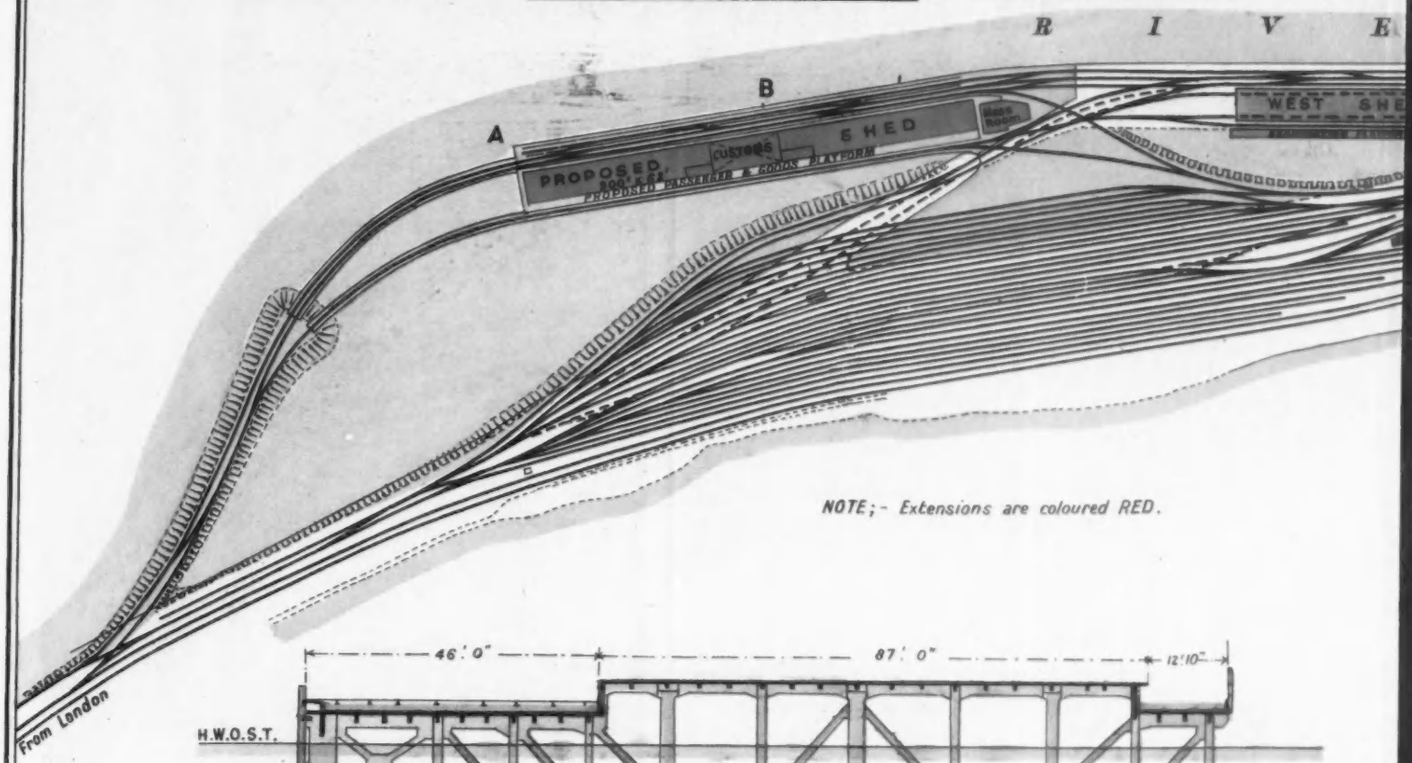


Parkeston Quay Extension. View under New Work at East End. May 19th, 1933.

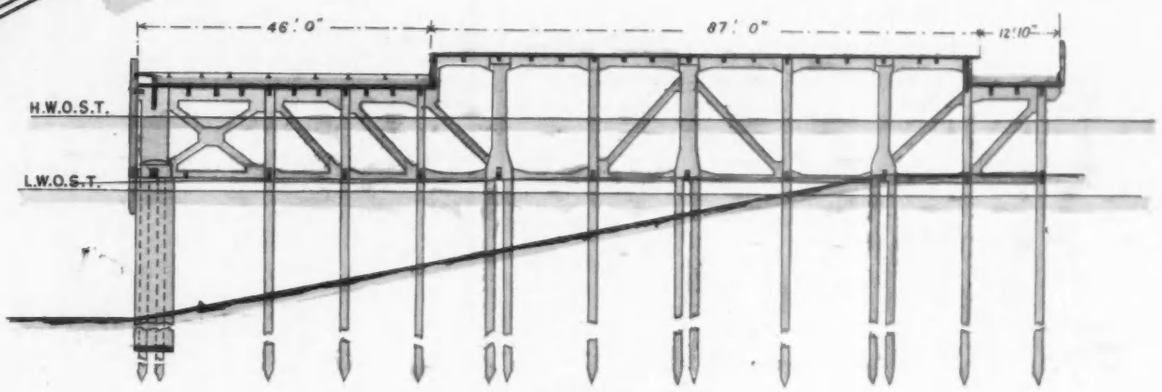
PARKESTON QUAY, HARWICH.

EXTENSION

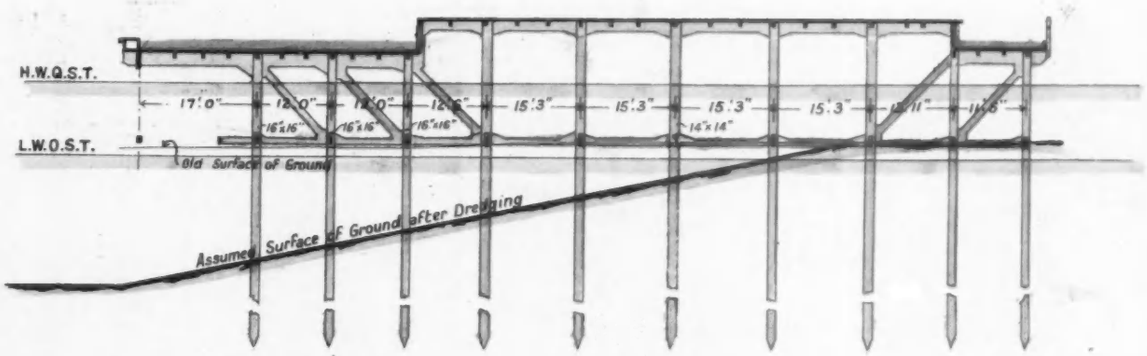
UNDER THE JURISDICTION OF THE LONDON & NORTH EASTERN RAILWAY Cº.



NOTE;- Extensions are coloured RED.



CROSS SECTION AT MAIN TRESTLES.



CROSS SECTION AT INTERMEDIATE TRESTLES.

Scale

FEET 100 50 0 100 200 300

Scale F

FEET 10 5 0 10 20 30

WARD & FOXLOW, LITHO, MARGUER

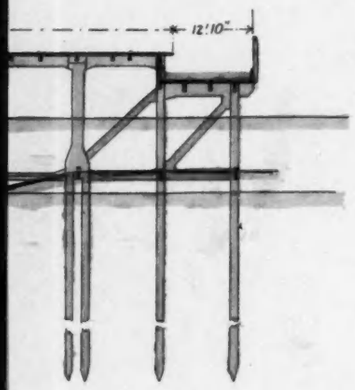
TO THE DOCK AND HARBOUR AUTHORITY, OCTOBER

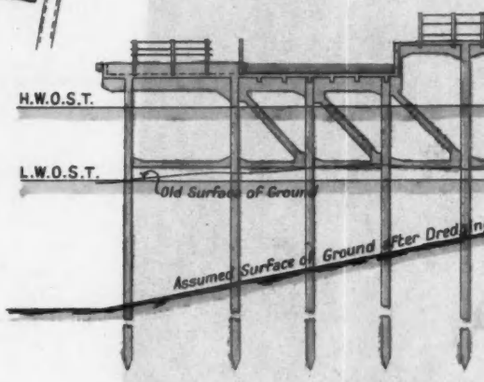
HARWICH.

ASTERN RAILWAY Co.

R I V E R S T O

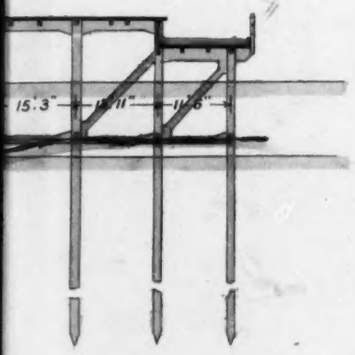
s are coloured RED.

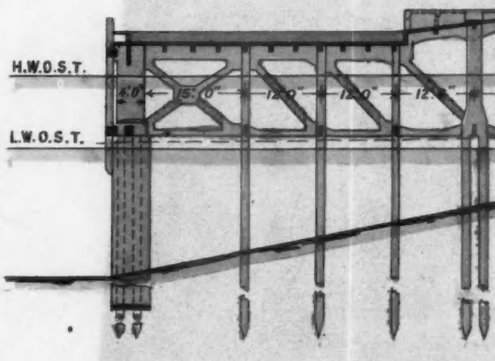




S.

END E





ES.

CROSS

Scale for Plan.

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Scale for Sections.

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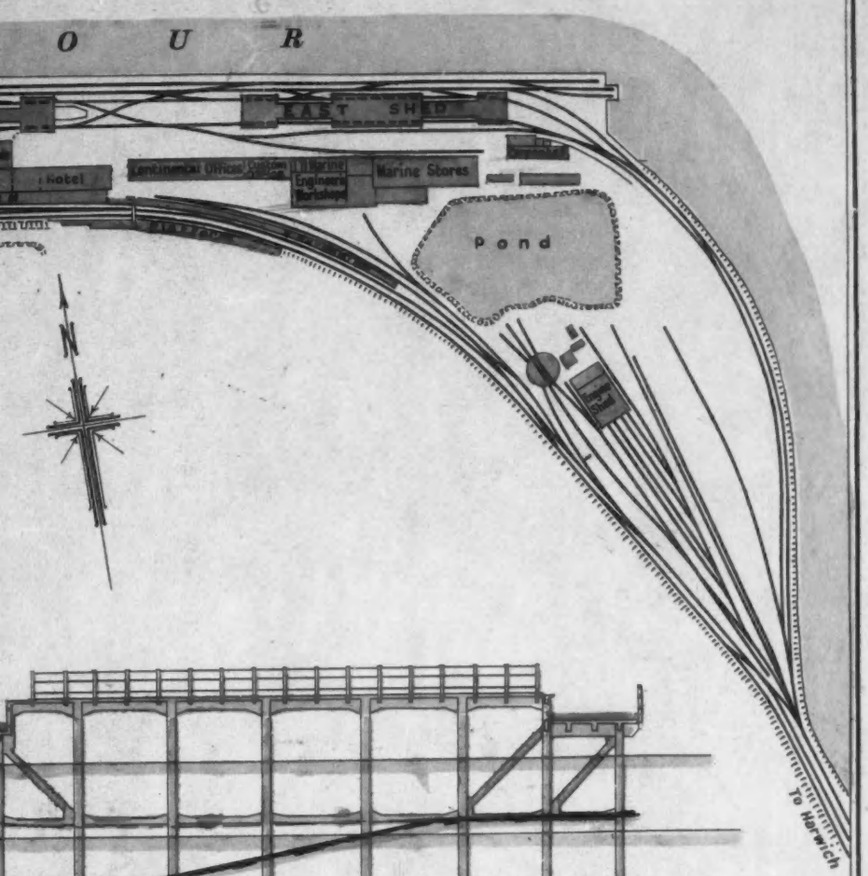
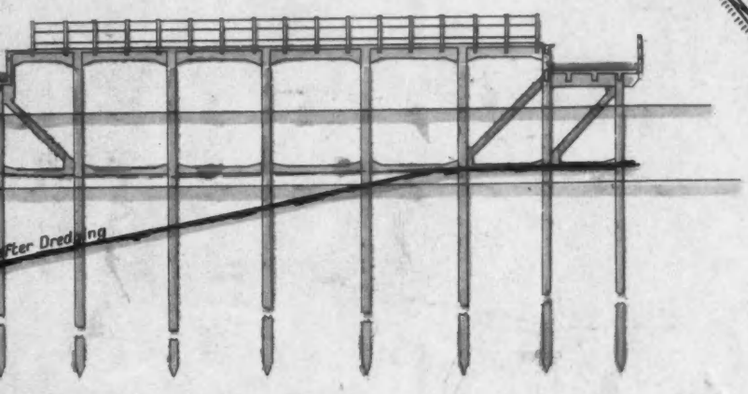
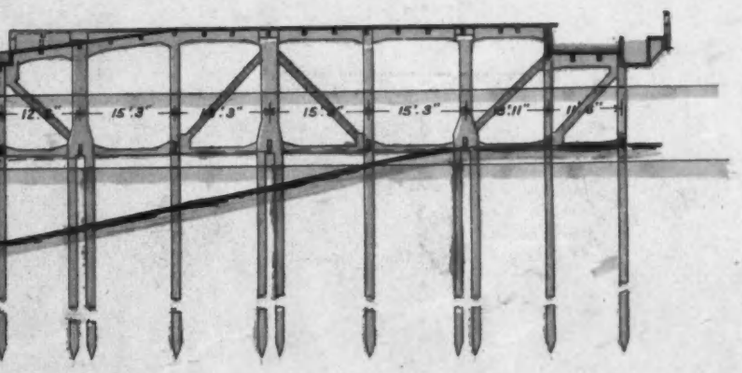
WARD & FOXLOW, LITHO. MARYLEBONE, W.





END ELEVATION AT A.



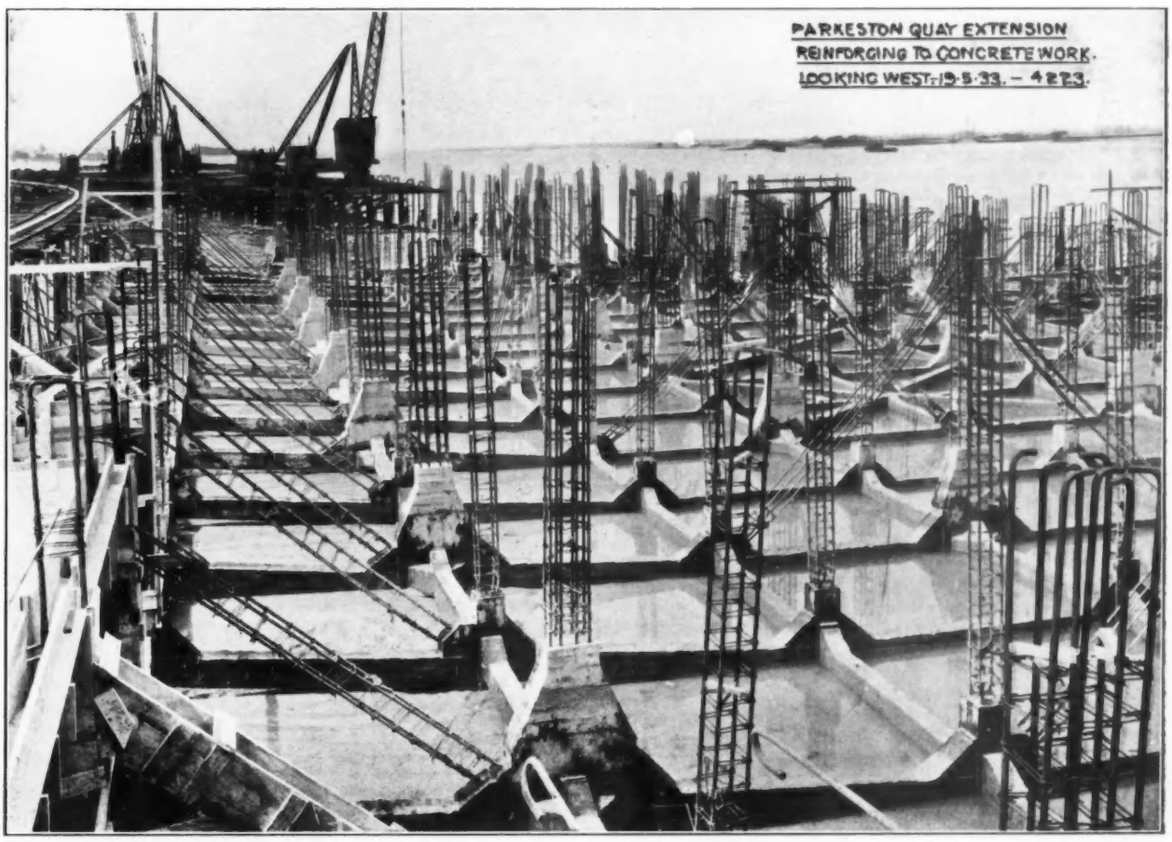
CROSS SECTION AT B.

CROSS SECTION AT MAIN TRESTLES.

CROSS SECTION AT INTERMEDIATE TRESTLES.

Parkeston Quay Extension, Harwich

Parkeston Quay Extension. General View from Crane on Existing Quay, looking West. May 19th, 1933.



Parkeston Quay Extension. Reinforcing to Concrete Work, looking West. May 19th, 1933.

Hull and the East Coast

Busy Period at Hull Docks.

THE Hull Docks are now experiencing their busiest period of the year, and the tonnage entered is well up to average. A notable feature is the arrival of numerous cargoes every week with sawn wood and pit props from Sweden, Finland, Russia, Poland, etc. Those from Russia have come forward with unusual promptness. Over 70 had arrived at Hull to the end of August, and with others have caused considerable congestion, incoming steamers having to wait anything from 8 to 12 days before being able to get a berth.

In order to speed up the movement of the timber imports, a fresh arrangement has been agreed to as a result of a conference of the dock and rail authorities and the timber importers. The experiment is to be carried on until October 31st, and it is hoped that the outcome will be the framing of amended regulations that will enable the heavy imports to be more efficiently dealt with next season. The arrivals to September 1st of timber, hewn and sawn, reached the high total of 715,165 loads, or 172,417 loads more than at the same date last year, and it is fully expected that the million loads will again be passed.

The imports of wheat and kindred cereals in the same period exceeded 852,000 tons, and of oilseeds 363,071 tons. In the former there was a decline of 74,000 tons, and in the latter an increase of 46,000 tons. The exports of coal from Hull were at about the same level as in 1933, while the total for all the Humber ports (Hull, Immingham, Grimsby and Goole) were 2,191,844 tons, or 37,716 tons more than in the corresponding eight months last year. In addition, the shipment of coal in ships' bunkers approached two million tons. Owing to import and currency restrictions, there has been a marked falling off in trade with Middle and Western Europe.

Improvements in Equipment at St. Andrew's Dock.

Many improvements in the equipment of the St. Andrew's Dock at Hull, the home of the fishing trade of the port, have been introduced by the London and North-Eastern Railway. Within the past few weeks there have been brought into use two improved slipways for the overhauling and re-painting of steam trawlers, and they have already proved a valuable addition to the dock facilities. They are conveniently situated at the West end of the dock and in close proximity to the Billingsgate and Coaling appliances. Owing to the increasing number and greater displacement of steam trawlers, it has been found necessary to provide the extra accommodation. Until these were constructed the facilities consisted of four slipways and two specially-arranged berths in one of the adjoining dry docks belonging to the railway company. Three of these slipways have been equipped with electric hauling winches, while a fourth, proving too small for the increased size of the steam trawlers, has been entirely reconstructed to take modern vessels and an additional slipway berth constructed alongside. Owing to the lay-out of the site and the restricted waterway, it was not possible to provide for this berth the usual runway to take the cradle on which the vessel is placed before hauling out of the water. In consequence, a side-traversing system was adopted which, in addition to the usual slipway appurtenances, includes traversing sections on which, after being hauled clear of the water, the vessel is traversed sideways and deposited on a prepared berth parallel to the main berth, after which another vessel can be drawn up from the water and deposited on the main berth. Thus, for a single runway, which involves costly under-water construction, two slipway berths are provided, whereas under the old arrangement a separate runway was necessary for each berth. The heaviest trawlers now in commission can be accommodated on the new slipways, which are provided with electric hauling and traversing winches and hydraulic jacks for transferring the vessel from the cradle to the fixed blocks on the side berth. The carrying out of the improvements involved some important foundation and cofferdam work, done under contract by A. Jackaman and Son, Ltd., Slough, while the slipway cradle, traversing gear and winches were supplied by Cowans, Sheldon and Co., Ltd., Carlisle.

Apart from these new facilities, three existing appliances for coaling trawlers are being renewed on modern lines, and the lay-out of the roadways and mains has been considerably improved. With the new Billingsgate, 1,400 ft. in length and 90 ft. wide, at the St. Andrew's Dock Extension to replace that destroyed by fire in 1929, and the modernising of the No. 1 Fish Market, 1,600 ft. by 90 ft., at the St. Andrew's Dock, together with additional fish-filletting premises, the London and North-Eastern Railway Company have expended a very big sum to meet the increasing demands of the Hull fishing industry, which has developed enormously in recent years.

New Dock at Grimsby nearing Completion.

The new dock which has been constructed at Grimsby by the London and North-Eastern Railway Company is now in such an advanced stage as to be ready for the formal opening ceremony on October 4th. The dock is on the site of reclaimed foreshore, has a water space of 37 acres and has been joined with the old No. 1 Fish Dock by the taking away of a jetty. It has taken three years to build, and has involved not only the dredging of the water area but the transport from the quarries at Brocklesby of thousands of tons of chalk stone used in the construction of the quay sides. An additional lock pit has been provided, and a new quay, 2,200 ft. in length, has been built and will be used for provisioning, coaling and fitting-out of the steam trawlers. Six of the latest type of coaling appliances have been installed, and these will supersede the antiquated method of bunkering by slinging baskets of coal from lighters into the vessels. The method of dry-docking has been brought into line with modern requirements, and general equipment follows closely that installed by the Company at St. Andrew's Dock, Hull. The provision of further fish marketing accommodation has not been considered necessary. About two years ago the existing Billingsgate was extended at its South end to enable 10 or 12 more trawlers to be berthed, thus increasing its length to nearly one-and-a-quarter miles. The new dock on which hopes of a great expansion of Grimsby's chief industry are centred, will be formally opened by Sir Henry Betterton on October 4th. In the quantity of fish landed during the course of a year Grimsby is only second to Hull, higher up the River Humber, but in point of value far exceeds it.

Improvement in Revenue at Scarborough Harbour.

The gross revenue of Scarborough Harbour from all sources, including lighthouse admission fees in the financial year ended March 31st last, was £6,848 11s. 3d., and the expenditure £6,491 17s. 1d., leaving a surplus before charging loans interest due to the Scarborough Corporation, £356 14s. 1. Of this amount, £152 19s. 7d. is the surplus on ordinary revenue account and £203 14s. 6d. on lighthouse account. In the previous year the gross revenue was £6,291, for 1932 £6,103, and for 1931 £6,870. The annual report comments on the steady improvement in revenue, and adds that but for the fact of a large maintenance charge and an unexpectedly heavy expenditure on litigation, the accounts would have given an admirable result on the year's working. It is expected that the maintenance charge will remain in the neighbourhood of £1,500 per annum, particularly if the Commissioners carry out their proposal to dredge the harbour annually. Upon examination of the items, it is interesting to note that both coal and goods dues show considerable increases. This source of revenue, which is derived entirely from coastwise shipping, is one, says the report, deservedly entitled to every form of encouragement, and the Commissioners should not be discouraged in their efforts to make full use of the North Wharf to relieve the congestion which sometimes arises from the use of the fish market by merchant vessels. Increases are also shown in the tonnage and bridge dues, fish dues and fish offal—all indicative of the increase in the fish traffic. Rents also show an advance, which is mainly due to the Commissioners' policy of making every inch of the piers a revenue-earning asset. On the expenditure side, attention is drawn to the decrease in wages and salaries due to the reorganisation of the staff; the increase in maintenance due to the dilapidated condition into which the piers were allowed to fall; and the costs of the law suit against a former chairman of the Finance Committee and the Commissioners' Auditors, returned at £1,105 15s. The general balance sheet shows an adverse balance of £22,930, an increase of £2,151. The only capital expenditure during the year was £77 on a new fog signal.

Annual Meeting of the Scarborough Harbour Commissioners.

At the annual meeting of the Scarborough Harbour Commissioners, Councillor Jackson presided, and in moving the adoption of the report, said that the dredging of the harbour was one of the most important they must consider in the next year. They were nearly back again to the condition before it was dredged last time. In the past two years it had tended to silt up more than ever before. He hoped that they would be able to obtain from the Government some tangible help in connection with the dredging of Scarborough and other Yorkshire harbours. Unless the work was done they would be at a disadvantage in respect of large vessels, of which 142 had entered during the past year. The maintenance charges of £1,599 seemed a very large sum, and was indeed a large sum to pay out of one year's revenue, but it would be impossible to keep the piers up to what they should be unless they determined to spend so much every year. Piling, which was still in a bad condition in many places, had cost £262, painting of the lighthouse £118, repairs to the fish market £361, and timber £332. Dues received from coal were £350, compared with £69 in the previous period, thanks to the Corporation's Electricity Committee having their coal sea-borne. Dealing with complaints regarding the use of the North Wharf, which had cost £28,000, the Chairman remarked that if it was erected merely for the herring season, which could not last more than six weeks, it was a mistake ever to have erected it. The money was spent to relieve the Fish Pier, and he believed the Board of Trade would approve of the way in which they were trying to use it.

The Port of Los Angeles, California

Geographical.

THE geographical position of the Port of Los Angeles is latitude 33° 43′ north, longitude 118° 16′ west. It is located 368 nautical miles south-east of San Francisco and 97 nautical miles north-west of San Diego.

General Description.

The port consists of two parts, an Outer Harbour, irregular in shape, formerly known as San Pedro Bay, containing about 981 acres of channel and anchorage area; and an Inner Harbour, formerly known as Wilmington Harbour, having a total water area of 804 acres and consisting of a series of channels 250 to 1,000 ft. in width with turning basins and numerous slips. The main channel, 1,000 ft. in width, leads from the Outer Harbour to a turning basin 1,600 ft. in diameter, opposite Smith's Island. From the turning basin, narrower channels extend to the West Basin and to the East Basin, and the Cerritos Channel, 400 ft. in width, extends from the East Basin to Long Beach Harbour. At the harbour entrance at the end of the breakwater the depth at mean low tide is 45 ft. It is 37 ft. in the principal channels and slips of both the Outer and Inner Harbours.

Early History.

Although San Pedro Bay was discovered by Cabrillo in 1542, there were no white settlements here until the founding of the Spanish Missions from 1769 to 1800. By the latter date the Pueblo of Los Angeles had become the largest settlement on the Pacific Coast. Commerce began in 1805 with the first call of the ship " Leila Byrd " of Boston. From then on, Yankee trading ships called regularly, monopolising the exports of hides and tallow from the Mission herds and bringing cloth, sugar and household goods.

The Mexican Government, with wise foresight, reserved in the grant of the Rancho Palos Verdes a public Embarcadero of 42 acres having 1,400 ft. of shore front, which is now the lower reservation of Fort MacArthur. It was here that trade was carried on until the middle of the century, transportation to and from Los Angeles being by ox-cart and stage. With the founding of Wilmington by Phineas Banning in the '50's, the centre of commercial activity was moved to the Inner Harbour.

Until improvement of the port was undertaken by the Federal Government in 1871, there was merely an open roadstead, protected on the west by the bluffs which terminate at Point Fermin, but entirely exposed on the south-east, south and south-west, except for the slight protection afforded by Catalina Island, twenty miles away. To the northward and separated from the Bay by a narrow strip of sand, called Rattlesnake (now Terminal) Island, was a large expanse of mud flats and shallow water as far as Wilmington. There was an entrance channel less than two feet deep at low tide on either side of Dead Man's Island (now Reservation Point) and a narrow, shallow channel thence to Wilmington, a distance of three and one-quarter miles.

The Port of Wilmington first attained commercial importance during the Civil War and the following Indian Wars, most of the supplies for the operations against the Indians of Arizona and New Mexico being landed there.

By 1869 the commercial growth of the port had become sufficient to justify building the first railroad of Southern California, from Wilmington to Los Angeles. This was later acquired by the Southern Pacific Railroad when it built over the Tehachapi Pass to Los Angeles in 1876.

In 1871 the United States Government was persuaded to undertake the improvement of this port and by 1881 had completed a jetty connecting Rattlesnake (now Terminal) Island with Dead Man's Island (now Reservation Point), thus producing a channel depth of 10 ft. The Southern Pacific Railroad then extended its line across Wilmington Bay to San Pedro bluffs near Timms Point, which then became the principal shipping centre because of its deeper water. The commerce and draft of ships so increased that in 1881 the United States adopted a project to deepen the channel to 16 ft. by extending jetties southward from Dead Man's Island and from Timms Point and dredging between. This was completed in 1893. In 1885 had come the second and competing trans-continental railroad to Southern California, namely, the Sante Fe.

The commerce of the port, which in 1871 had been only 50,000 tons, had by 1888 increased to 500,000 tons. The city's population also changed from 15,000 to 60,000. This was the real start of commercial importance, for the rapidly increasing population required supplies, lumber, etc., much of which came by water, thus demanding transportation facilities and laying the foundation for the present growth of the community.

In 1891 and 1892 came the second railroad to the port to obtain its share of the commerce. In that year the Los Angeles Terminal Railway was built from Los Angeles to Long Beach and thence westerly along Terminal Island, constructing its wharves along the easterly side of the main channel. This road later became part of the Los Angeles and Salt Lake Railroad, which in turn was absorbed by the Union Pacific Railroad in 1921.

By 1909 the Southern Pacific and Salt Lake Railroads had built their wharves along each side of the main channel, the Outer Harbour Dock and Wharf Company had begun construction of a wharf and transit shed on its 124-acre fifty-year lease in the Outer Harbour, granted by the City of San Pedro in 1907, the Pacific Wharf and Storage Company had begun construction of a wharf and transit shed on its 79-acre, fifty-year lease, from Long Beach, on the site now occupied by the Bethlehem Shipbuilding and Dry Dock and the General Petroleum Corporations. The Crescent Wharf and Warehouse Company was building a transit shed on the easterly side of the main channel, which shortly became the first berth of the Yale and Harvard, while several lumber companies had constructed their own wharves in other locations.

At that time most of the wide expense of tidelands (approximately 1,300 acres) lying between San Pedro and Wilmington had been granted by State patents years before to private interests.

The progressive citizens of Los Angeles realised the economic advantage of adequate port development, and the necessity of a marine gateway in order to build up its commerce.

As a preliminary step toward annexation of the two harbour cities, Los Angeles had extended its boundaries in 1906 to the westerly limits of San Pedro and Wilmington.

The Los Angeles City Council in 1907 adopted an ordinance creating the first Harbour Commission. Geo. H. Stewart, F. W. Braun and T. E. Gibbon were appointed in March, 1908, and with A. P. Fleming as Secretary carried on the legislative fight for the enabling act which the State Legislature passed in January, 1909, permitting the consolidation of Los Angeles, San Pedro and Wilmington.

The validity of the tideland patents granted prior to the annexation of the harbour cities had been questioned in 1908, and as a result the City of Los Angeles brought suit in the name of the State to recover title for the people.

The long drawn-out litigation which followed resulted, in 1913, in the Supreme Court of the State handing down its final decree, confirming title to these tidelands to the City as Trustee.

Investment in Port.

The City of Los Angeles has expended a total sum of $41,798,000 in building and maintaining the port.

Money expended by the City has been obtained by bond issues to the extent of $29,900,000, the remainder having come from general tax funds. Of the bonds issued $21,498,500 are outstanding (June 30th, 1933), the others having been retired according to schedule. Harbour Bonds are general obligations of the City of Los Angeles and not a specific lien upon Harbour properties.

The first bond issue of the City for harbour improvement was voted in 1910, and amounted to $3,000,000. In 1908, two years prior to this issue, the City of Wilmington had voted $100,000 of bonds for harbour improvements. These bonds were assumed by the City of Los Angeles when Wilmington and San Pedro were annexed in 1909. Four other bond issues for harbour improvement have been authorised by voters of Los Angeles—in 1913, 1919, 1921 and 1923.

Harbour bonds are issued under the Charter limitations which apply to bonds issued for revenue producing projects. The total amount of bonds which the City may issue for such projects must not exceed 12 per cent. of the assessed valuation of the City. For non-revenue producing projects, the limit is three per cent. Revenue-producing Harbour bonds outstanding as of June 30th, 1933, amount to only 1.54 per cent. of the assessed valuation.

Municipal Port Facilities.

The total water-frontage at Los Angeles Harbour is approximately twenty-five and one-half miles. Less than half of the total, namely, 59,000 ft., is as present undeveloped. Wharves of a total length of 65,781 ft. occupy a portion of the developed frontage and other facilities occupy the remainder.

The Port of Los Angeles—continued

The total improved water-frontage equals 70,798 linear ft., classified as to use, as follows:—

	Linear feet
Freight and Passenger	26,129
Lumber Industry	17,210
Petroleum Industry	11,565
Shipyards	6,021
Fishing Industry	3,923
Miscellaneous	5,950

Approximately 95 per cent. of the wharves, sheds and other port facilities which are available to the public, are owned and operated by the City of Los Angeles. The Municipal wharves are modern in design and construction, 31,993 linear ft. being of timber deck construction supported by creosoted timber piling; 10,639 ft. of composite concrete and timber design, and 1,950 ft. of reinforced piles with concrete deck. The total length of municipal wharves is 44,582 ft.

The aggregate length of private wharves is 21,119 linear ft., all of timber construction with the exception of 450 composed of concrete.

The City of Los Angeles owns and operates 24 transit sheds, varying in width from 44 to 120 ft., present standard, with a combined length of 16,207 ft. These sheds are of the one-storey type with two exceptions, which are two stories in height, 100 ft. wide and 980 ft. long, the second stories of the sheds being connected by runways and reached by ramps.

In addition to shedded wharves for the handling of general cargo and of open wharves and areas for special industry uses, the port has a special fish harbour at the south-westerly end of Terminal Island, consisting of an enclosed area of about 40 acres well protected by secondary breakwaters, with land areas on the north and west sides for the use of fish canneries, boat building and repair plants, and oil-servicing stations, particularly useful for the harbour's extensive fishing fleet. An additional reinforced concrete mole breakwater has recently been constructed southward, more than doubling the sheltered area and still further increasing the capacity.

All these harbour facilities are readily accessible by motor trucks over well-paved highways, as well as by rail over the Harbour Belt Line Railroad connecting with the three trunk railway systems and the electric inter-urban railway which serve the port.

United States Government Facilities.

With the first Federal appropriation of $200,000 made in March, 1871, for the improvement of the Port of Los Angeles, the United States Government has expended $12,643,757 on the breakwater, dredging and jetty work up to June 30th, 1933. The existing breakwater has a length of 2.11 miles, a width at the top of 20 ft. and a base width at the lighthouse of 200 ft. with elevation of its top at 14 ft. above mean lower low water. The revolving light at the seaward end, with an intensity of 67,000 candle power and a range of 14 miles, is 73 ft. high.

The Government has reclaimed approximately five acres of tide and submerged lands as an adjunct to the Fort MacArthur Military Reservation in the San Pedro District. It has dredged the entrance channel to 35 ft. at mean lower low water as far inland and including the Turning Basin, and a channel 35 ft. deep and 650 ft. wide from the Turning Basin to Slip No. 5, thence 400 ft. wide through the East Basin to the Los Angeles City boundary. The Government has also reclaimed for its use 64 acres of land at Reservation Point on the east side of the main channel opposite San Pedro, and in connection therewith removed " Deadman's Island " and widened the adjacent channel to 1,000 ft.

In 1928 Congress appropriated the sum of $650,000 for the construction of a Federal Building in the San Pedro District—the appropriation having since been reduced by ten per cent. due to reduction in prices of labour and materials during the current depression. Considerable discussion has ensued as to the proper location of the building—the plaza site at the corner of Beacon and Seventh Streets being now definitely abandoned, and the site at the south-west corner of Beacon and Eighth Streets generally accepted. Pursuant to the policy of the new administration, funds originally allocated for the purpose have been temporarily diverted to the emergency relief work of the Civil Conservation Corps, and the Federal Building construction will be temporarily held in abeyance.

The need for a Federal Building in the San Pedro District is universally accepted as imperative. As a result of the rapid increase in foreign mail during the past few years, the cramped conditions in the San Pedro Post Office demand double the floor space now occupied for the expeditious handling of the mails passing through the local office which is fast approaching San Francisco and Seattle in the volume of foreign mail handled. Local Postal receipts during the past twenty years at San Pedro have consistently shown an excess of revenue over operating expense.

The convenience to the general public which will result from concentrating and housing the Post Office, the Customs House, the Public Health Service, the Shipping Board, the Bureau of Navigation and Steamboat Inspection and the Immigration Service in one building, is quite apparent, and San Pedro looks hopefully forward to the early construction of the Federal Building.

Throughout the history of this port, in accordance with the authority granted by Congress giving the Federal Government control over navigable waters of the United States, the Engineering Department of the Army, functioning through the local District Engineer, has exerted a controlling influence on the development of the port.

Breakwater Extension.

The existing San Pedro arm of the breakwater in Los Angeles Outer Harbour was begun in 1899 and was completed by the United States Government in 1912, at a time when less than 3,000 ships entered the harbour annually, and commerce slightly exceeded two million tons. Ship arrivals in recent years have averaged over 8,000 annually, and cargo has averaged twenty-five million tons.

This increase in traffic created an urgent demand for berthing space, and particularly for sheltered anchorage grounds in the Outer Harbour, which could be provided only by an extension of the breakwater in a port such as Los Angeles with its open roadstead, subject to the long Pacific Ocean swells in settled weather and to waves from the south-east storms during the winter months. Recognising the necessity for an extension to the breakwater, harbour officials, civic organisations and shipping interests for ten years have consistently worked for its construction, and their efforts were finally rewarded in 1932 by Federal approval of the project—actual construction work being in progress since the latter part of 1932.

In 1925, after numerous presentations of pertinent facts and arguments on the part of local interests, Congress adopted the report of the Chief of Engineers of the War Department, recommending the construction of an extension to the existing San Pedro Breakwater sufficient in length to entirely enclose the Outer Harbours of Los Angeles and Long Beach. At that time, the Federal Government proposed to assume 50 per cent. of the breakwater cost—then estimated at $14,000,000—provided the local communities of Los Angeles and Long Beach assumed the other 50 per cent. and also meet a number of stipulations and conditions imposed by the Government.

In September, 1929, upon request of the two ports, a hearing was granted before the Board of Engineers, War Department, Washington, D. C., at which time a revised design and new location of breakwater were submitted, involving a large saving in quantity of rock through the use of dredgings from Los Angeles Outer Harbour in building up the ocean floor from the 50-ft. depth to a depth of approximately 20 ft. The estimated cost was thereby reduced from the original figure of $14,000,000 to $7,000,000—the sum which Congress had originally contemplated would represent its 50 per cent. share of the work. Favourable action was also taken upon the recommendation that the other conditions previously imposed upon the communities, be waived.

The breakwater project was approved on April 2nd, 1930, by the Board of Engineers for Rivers and Harbours, War Department, including the dredging in the Inner and Outer Harbours of Los Angeles and Long Beach, at the total estimated cost of $8,346,000. These combined projects were included in the Rivers and Harbours Bill by the Rivers and Harbours Committee of the House of Representatives on April 11th, 1930. The Bill was later adopted by both the House and the Senate, and was signed by the President. An initial appropriation of $700,000 was made on September 13th, 1932, shortly after which construction work was commenced.

The breakwater extension, as finally planned, lies on the prolongation of the outer arm of the San Pedro Breakwater—leaving a 2,000-ft. opening eastward of the existing lighthouse—and extends in a straight line for a distance of 12,500 ft. to a point located due south of the westerly line of the Los Angeles Flood Control Channel east of Long Beach Harbour. The plan provides a large protected anchorage for commercial and Naval vessels, and also permits future extension to the east of Long Beach Harbour in the event of additional anchorage grounds being required.

The breakwater extension will have a distinct value to the port in providing adequate protection to existing and future works located in the San Pedro sector of the Outer Harbour and on the south side of Terminal Island, thus reducing to a minimum the heavy annual maintenance charges which have been incurred in the past from lack of adequate protection.

Developments accompanying the National Recovery programme appear to assure completion of the structure at an early date, and in sufficient time to avoid what might ultimately have been dangerously cramped anchorage facilities, which are extremely limited when the combined Atlantic and Pacific Fleets are based here. The extended breakwater will aid greatly in assuring commercial vessels and the Naval Fleet a safe anchor-

The Port of Los Angeles

Los Angeles Harbour, showing Government Breakwater and Main Channel to Inner Harbour.

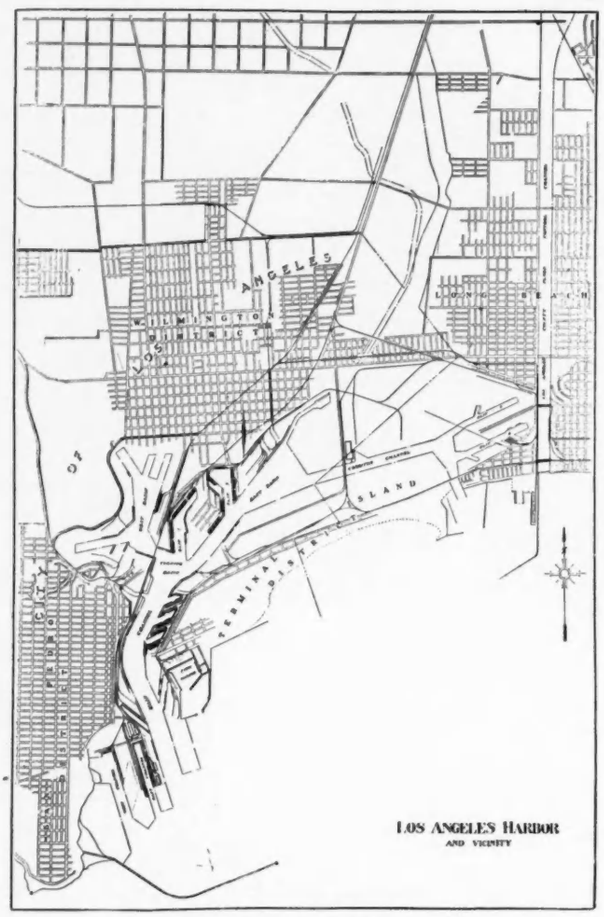
Marine Terminal Facilities on Main Channel, Los Angeles Harbour. "Empress of Britain" in foreground.

The Port of Los Angeles—continued

age, and will reduce the ill effects of storm and surge to a degree which will greatly aid shipping in the Outer Harbour.

Plans and specifications for the complete project have been completed for some time, and two breakwater contracts have already been awarded for specific units of the work.

The unit initiated under the first $700,000 appropriation involves the placing of 120,000 cub. yds. of core rock—weighing a minimum of 120 lbs. per cub. ft.—to cover the clay base composed of dredgings. Over the lighter core rock, 103,000 tons of armour rock, weighing 160 lbs. per cub. ft., will be placed. This material will complete approximately 1,400 linear ft. of the breakwater. This section of the breakwater, under contract by the Puget Sound Dredging Company, was completed early in 1934.



Los Angeles Harbour in 1933.

The contract for continuance of the work during the ensuing year was awarded late in 1933 to the Rohl-Connolly Company—involving an expenditure of $1,520,000—and will add 4,000 linear ft. to the length of the structure. The contract includes the dredging and placing, in the base of the breakwater, 460,000 cub. yds. of material obtained by widening the easterly side of the fairway, the placing of 320,000 cub. yds. of Class B rock in the lower portion of the rock section, and 300,000 tons of Class A rock, consisting of blocks weighing 10 tons or more, in the upper section exposed to wave action.

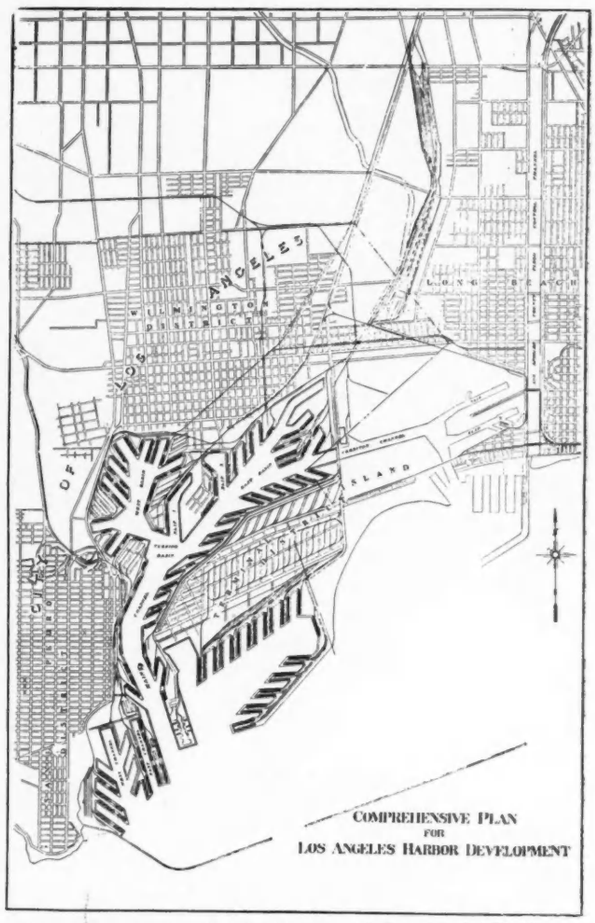
The rock for the breakwater construction is obtained from private quarries located on Santa Catalina Island, and will be transported on large wooden barges now under construction on a municipal lease site in Los Angeles Harbour by the contractor. Material for the base of the breakwater extension was dredged, under two completed contracts, in widening the main entrance fairway at a cost of approximately $105,000.

To the end that interference with shipping in and out of Los Angeles Harbour might be minimised, construction work on the breakwater was commenced at the east end and is proceeding westerly towards the end of the existing breakwater. Considerable assistance has been given by the United States Lighthouse Service in providing temporary navigation aids.

Harbour Belt Line Railroad (Los Angeles Harbour).

By virtue of a contract entered into by and between the Board of Harbour Commissioners of the City of Los Angeles, Southern Pacific Company, Pacific Electric Railway Company, Los Angeles and Salt Lake Railroad Company and The Atchison, Topeka and Santa Fe Railway Company, and under authority granted by the Interstate Commerce Commission, all railroad facilities lying within a specfied area at Los Angeles Harbour were consolidated into a single terminal railroad unit to provide an impartial, efficient, economical and unified freight terminal switching service to all public and privately-owned wharves, docks, industries and other terminal facilities located at Los Angeles Harbour.

Unified operation of railroad facilities at Los Angeles Harbour commenced on June 1st, 1929, under a single, independent and neutral operating management known as the Harbour Belt Line Railroad. Through this agency, Los Angeles Harbour is advantageously equipped with a complete belt line railroad facility serving all wharves and industries within the Harbour District, rendering a complete rail transportation service to and from all shipping locations.



Comprehensive Plan for Development of Los Angeles Harbour, showing Breakwater Extension now under construction.

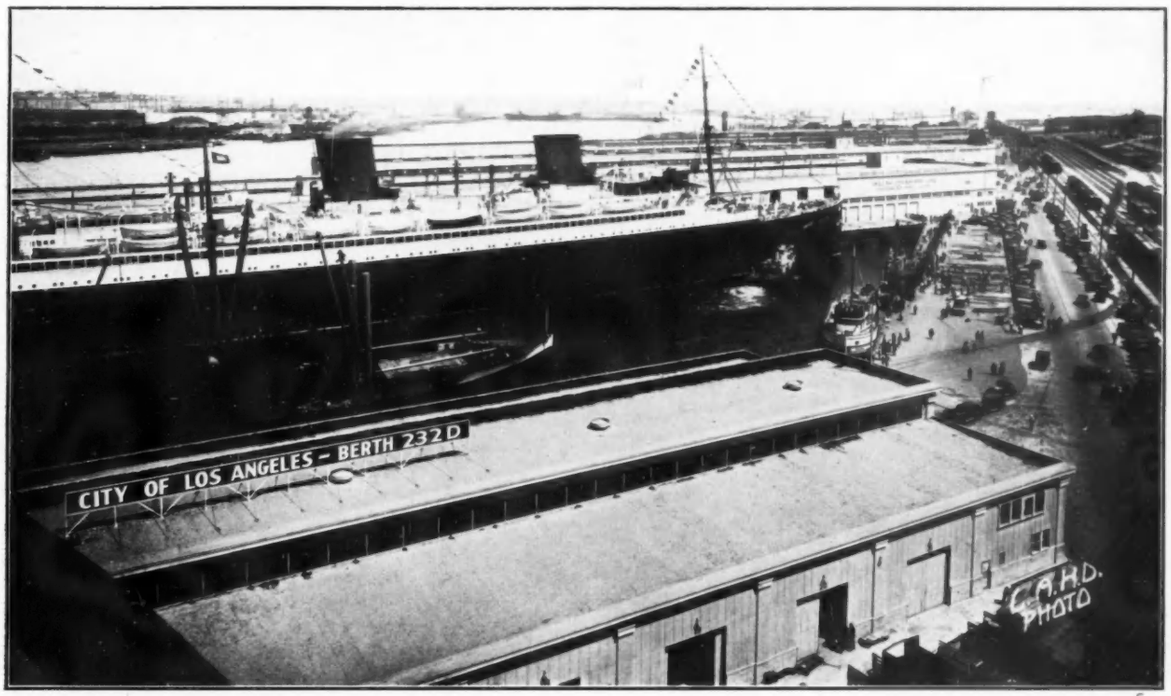
The Harbour Belt Line Railroad, comprising 127 miles of trackage, is jointly owned by the City of Los Angeles and the railroads serving Los Angeles Harbour and through its independent operation, all railroads are made inter-connecting with access to and from all wharves and industries within the zone of unification, providing a switching service of the most excellent character to all shippers and receivers with equal dispatch.

As one of the essentials of port co-ordination, the unification of railroad properties at Los Angeles Harbour under one neutral management, separate and distinct from that of the several railroad companies serving the port, and in which the City of Los Angeles has equal voice in its management and control, is productive of better public service, economy and efficiency, representing a progressive step in the transportation problem surrounding port development.

The control and management of the Harbour Belt Line Railroad is vested in a Board of Control and a Board of Operation. The Board of Control comprises eight members, four of whom are appointed by the City of Los Angeles and one each by the four railroads. Under this arrangement, the City of Los Angeles is given equal voice with the railroads in the control of all the railroad properties at the Harbour and insures unhampered future development of facilities in harmony with port expansion.

After four years of operation, the Harbour Belt Line Railroad has proven itself to be a successful medium for the quick interchange of freight traffic between rail and water carriers. The Belt Line has extended a rapid and economical switching service to and from all points within the confines of the zone of unification, this terminal service having been reflected in railroad line

The Port of Los Angeles



Terminal Island Sheds, Los Angeles Harbour, showing Rail and Truck Facilities.

Pier 1 at Entrance to Main Channel, Los Angeles Harbour.

The Port of Los Angeles—continued

haul movements as well as having been of material assistance to steamship operators in relieving dock congestion.

Transportation experts have declared the Harbour Belt Line Railroad to be one of the most valuable assets possessed by any port in this country, and that it should be an incentive to encourage increased commerce and lend distinction to Los Angeles Harbour as a world port.

Highways and Truck Transportation.

While the port is well served by rail facilities, the past few years have seen a decided change in the method of transportation of lumber and general cargo to and from the port.

Combination of two important factors at Los Angeles Harbour causes the supporting highways system to be of prime importance in the development of the port. First is the geographical one set up by the fact that there is a distance of some twenty-five miles separating the waterfront from the business and industrial sections of the city. Second, is the condition that has been reasonably constant during the past few years whereby approximately 75 per cent. of the entire port tonnage, other than bulk oils, has been handled by motor truck.

At the present time the Harbour is served by five major, together with several lateral distributing highways.

Owing to the equable climatic conditions of this great and varied tributary territory, truck transportation has proven itself an ideal means for the movement of goods and merchandise to and from the Harbour, as a producer or manufacturer can transport his goods directly to ship side for export and reversely the same truck can return loaded with raw material or merchandise for the manufacturer and merchant.

The wharves at the Harbour are so constructed that both rail and truck carriers may load or discharge freight with a minimum of confusion and delay as well as allowing for the quick dispatch of all vessels. In the event that the greater portion of a cargo is to be transported by motor truck, the loading areas at the rear of the sheds, which are paved, are made available for truck loading, and should rail loadings predominate, the trucking activities can readily be confined to areas free from rail interference.

Under the supervision of the California Railway Commission, a very efficient and speedy Highway Transportation System has been developed, creating a balanced competitive condition between the truck carriers and the railroads that has been a great advantage to the communities served.

Passenger Transportation.

Southern California, long known as a tourist Mecca, has shown a decided increase in the past few years in the number of visitors entering by way of inter-coastal, coastwise and foreign ships through the port.

While not contributing directly to commerce, marine passenger traffic, as a factor in the growth of any port, has been fully realised at Los Angeles Harbour.

Exclusive of over 800,000 annual Catalina Island visitors, the majority of whom were tourists, the fiscal year ending June 30th, 1933, records 530,885 passengers entering and leaving Los Angeles Harbour by off-shore ships.

Notwithstanding the fact that most of the revenues of a port are derived from freight cargo, and the flow of such cargo is to a certain extent, the result of the port's location, its convenience to the shipper and the facilities for handling, it is true also that terminals must be provided with facilities for the segregation of freight and passengers, or the port lose a very substantial amount of excellent advertising and considerable valuable respect from the travelling public.

The recent completion of a new marine passenger and cargo terminal in West Basin, Inner Harbour, an outstanding facility of its kind on the Pacific Coast, culminates the belief, on the part of the Port Commission of the importance to the port of providing adequate, clean, commodious and safe passenger facilities which permit segregating passengers and visitors from the noise and danger incident to cargo handling operations on the main floor of cargo terminals.

The new terminal is designed, not only for general cargo purposes, but is especially arranged for the use of those shippers whose business includes a large volume of passenger trade or extensive movements of structural steel and iron and steel pipe.

The usual exposure of passengers to risks encountered in passing through the more or less dangerous and noisy areas utilised for trucking, storage and handling cargo, has been completely avoided at this terminal by the construction of an overhead passenger corridor, 18 ft. in width, situated along the ship-side of the transit shed, for handling passengers.

Access to the corridor is provided by wide, easy ramps of fireproof construction, leading from attractively finished waiting rooms on the land side of shed at either end of the terminal.

A policy has been adopted by the Board of Harbour Commissioners for the construction of modern passenger facilities at all of the new terminals projected and to provide such accommodations at the older transit sheds at the Harbour when reconstruction becomes necessary.

Port Commerce.

The commerce through the Port of Los Angeles has increased very rapidly since the World War, and particularly since 1922, reaching a peak of 26,099,245 tons during the year 1929, this being an increase of over 400 per cent. of the 1922 tonnage, and aggregating approximately 18,000,000 tons (three times the 1922 tonnage) during the fiscal year 1933. The greatest increase occurred in the fiscal year 1922-23, when total tonnage passing through the port jumped from 6,533,589 tons to 18,870,102 tons, or 289 per cent. This increase was due principally to oil shipments.

Recent economic conditions have made it difficult to analyze trends and distribution of various types of commerce, but the following discussion, based upon the past five years, will serve to illustrate them to a degree. During the past five years, (up to June, 1933), commerce passing through the port has averaged 22,500,000 tons annually, with an average annual value of $902,535,543, divided as follows:—

	Tonnage Per cent.	Value Per cent.
Lumber	5·73	2·92
Petroleum	79·34	22·71
General Cargo	14·93	74·37
Total	100·00	100·00

Lumber reached its peak in volume in 1923 with 2,825,000 tons with a gradual decline to 612,000 tons in 1933. Petroleum reached a peak of 21,544,000 tons in 1923, declined somewhat for a few years, and reached a second peak of 22,883,000 tons in 1930. General cargo has shown a consistent growth, reaching a peak of 4,830,000 tons in 1929 and declining with the general economic conditions prevalent in ocean-borne commerce since then.

An analysis of the total tonnage of commerce passing through the port during the past five years (up to June, 1933) shows the following:—

	Per cent.
Foreign Imports	2 48
Foreign Exports	25·27
Coastwise Receipts	22·32
Coastwise Shipments	49·93
Total	100·00

This analysis indicates that slightly over one-fourth (27.75 per cent.) of the tonnage was foreign trade and slightly less than three-fourths (72.25 per cent.) was domestic trade. From the standpoint of source and destination, one-fourth (24.80 per cent.) of the tonnage was inbound and three-fourths (75.20 per cent.) was outbound.

Due to the large volume of oil passing through the port, the above figures do not give a clear picture of the relation of port commerce to the community at large. The following table pertaining to general cargo shows that this item, with a five-year (up to June, 1933) average of 3,768,938 tons, was segregated as follows:—

	Per cent.
Foreign Imports	14·31
Foreign Exports	9·28
Coastwise Receipts	62·86
Coastwise Shipments	13·55
Total	100·00

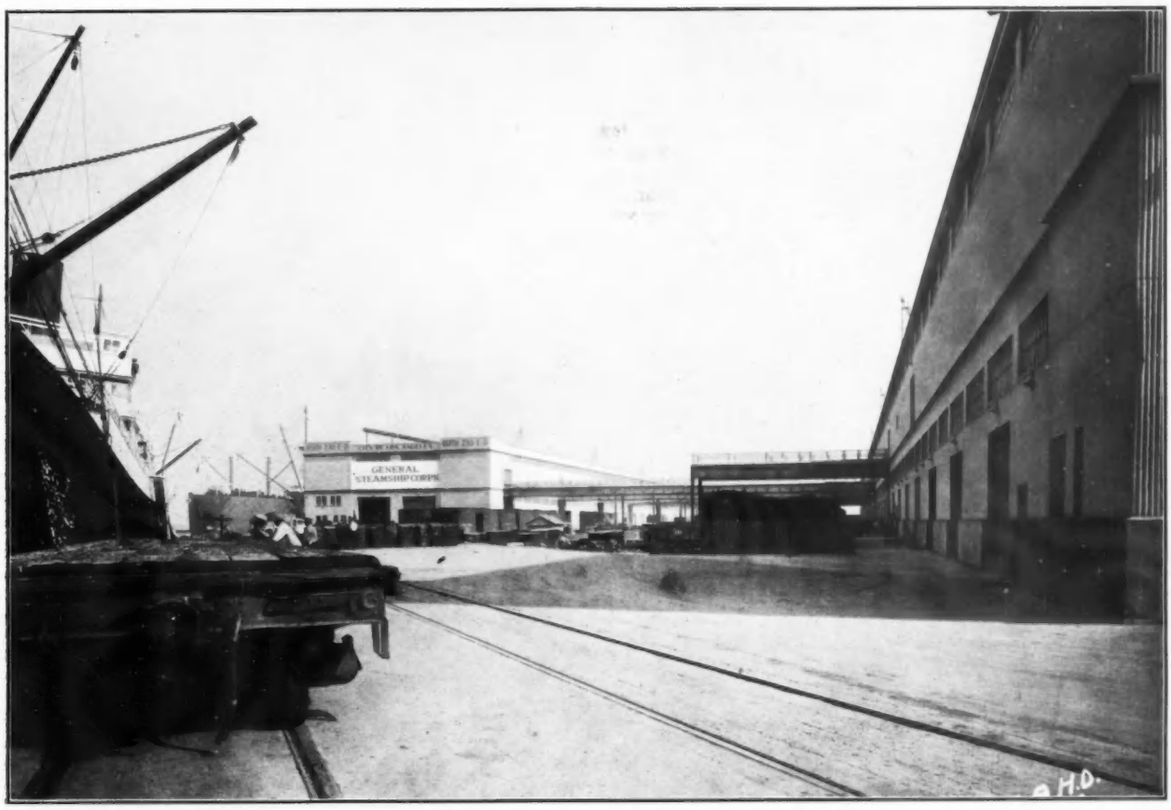
General cargo was made up of approximately one-fourth (23.59 per cent.) foreign and three-fourths (76.41 per cent.) domestic trade. As between inbound and outbound tonnage, it was greatly unbalanced, three-fourths (77.17 per cent.) being incoming and slightly less than one-fourth (22.83 per cent.) outgoing commerce.

From the standpoint of value of commerce passing through the port, the picture is somewhat different. For the past five-year (up to June, 1933) period, the value of such commerce was made up as follows:—

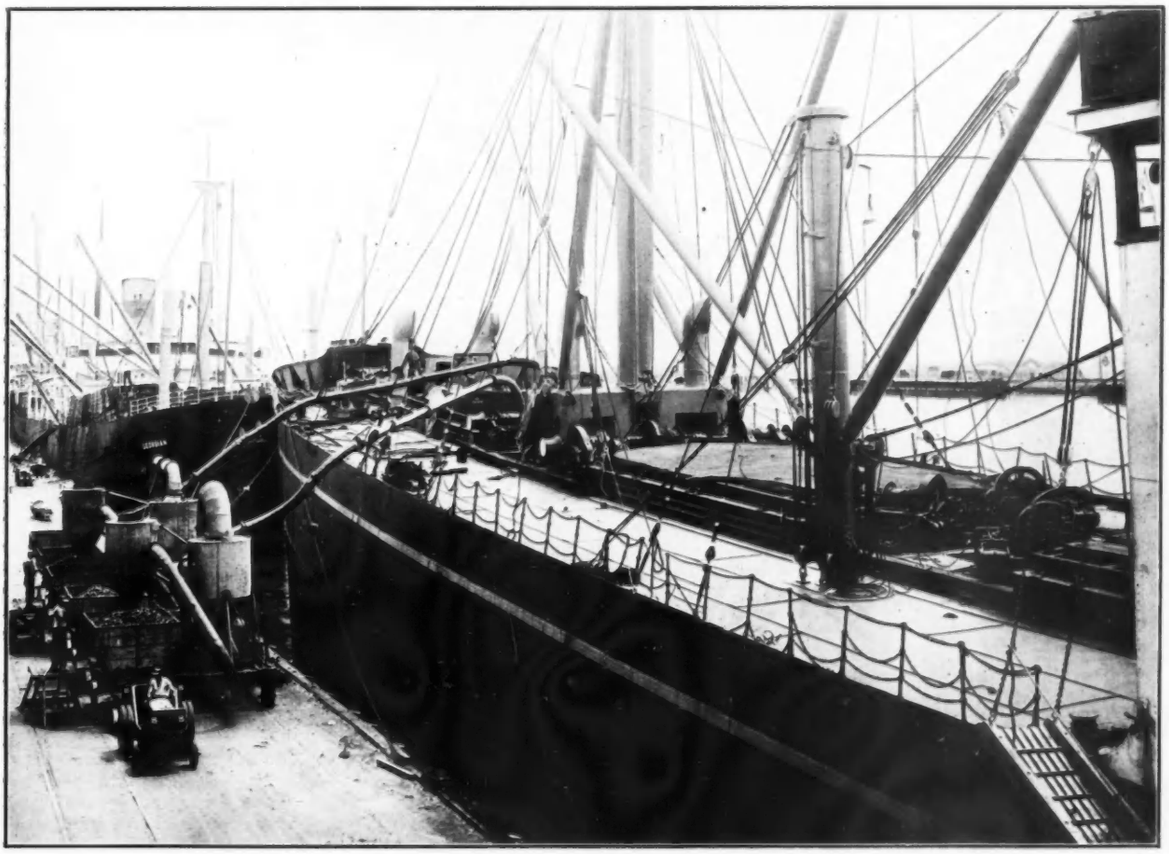
	Per cent.
Foreign Imports	5 26
Foreign Exports	13·68
Coastwise Receipts	50·56
Coastwise Shipments	30·50
Total	100·00

Nearly one-fifth of the value of the commerce (18.94 per cent.) was foreign trade, and the remainder (81.06 per cent.) domestic commerce. Analyzed as to the source and destination, over one-half (55.82 per cent.) was inbound and 44.18 per cent. outbound commerce.

The Port of Los Angeles



Ship to Rail Facilities, Los Angeles Harbour.



Unloading Copra, Los Angeles Harbour.

The Port of Los Angeles—continued

The value of general cargo follows somewhat more closely the value of total commerce than does tonnage of general cargo. Such value, averaging $726,278,190 annually during the past five-year (up to June, 1933) period was segregated as follows:—

	Per cent.
Foreign Imports	6·94
Foreign Exports	7·69
Coastwise Receipts.	61·80
Coastwise Shipments	23·57
Total	100·00

One-seventh (14.63 per cent.) of the value of general cargo was in foreign trade, the remainder (85.37 per cent.) being domestic trade. Over two-thirds (68.74 per cent.) of the general cargo was inbound, with 31.26 per cent. outbound commerce.

Coastwise receipts up till the last four or five years were divided largely between lumber and general cargo, very little inbound petroleum being received, but commencing in 1929, petroleum receipts took on considerable importance and have averaged one-third (33.84 per cent.) of the total volume of receipts since that time, being next to general cargo, which accounted for 42.05 per cent. of the tonnage.

Most of the intercoastal commerce, passing through the Panama Canal, is with the North Atlantic points, 81 per cent. of the volume of receipts and 94 per cent. of the volume of shipments being to and from this area. Of the total intercoastal receipts during the year ended June 30th, 1933, iron and steel products constituted 62 per cent. of the tonnage received and petroleum accounted for 93 per cent. of the outbound tonnage.

Geographical Divisions.

Foreign commerce in 1932-33 was valued at $85,244,109, of which $58,870,837 represented exports and $26,373,272 imports distributed among seven major geographical areas, which, in order of their importance, were as follows:—

1.—Asia, Australasia and Oceania. 2.—Japan. 3.—North-western Europe. 4.—Mexico and Central America. 5.—Canada. 6.—South America. 7.—Mediterranean, Balkan Countries and Africa.

From the standpoint of export to these geographical territories, Asia, Australasia and Oceania is first with outbound shipments, valued at $18,585,656; North-west Europe next in importance, with outbound cargo valued at $14,149,791; Japan third with $12,267,624; Canada fourth with $3,666,050; Mexico and Central America fifth with $3,354,119; South America sixth with $1,694,229; and the Mediterranean and Balkan countries and Africa seventh with $912,661.

The imports into Los Angeles Harbour from these same districts present a very different story. In this case, Asia, Australasia and Oceania still lead in valuation with Japan second; North-western Europe third; South America fourth; Mexico and Central America fifth; Canada sixth; and the Mediterranean and Balkan countries, and Africa, seventh.

In ranking next to New York in foreign commerce this port's foreign trade for the year ending June 30th, 1933, aggregated 4,976,613 tons, of which 4,566,548 tons were exports and 410,065 tons being imports.

Most Important Countries.

To really comprehend the picture of foreign trade at Los Angeles Harbour it is necessary to understand the relative importance of the various countries, as well as the geographical divisions.

Next to Japan, the most important single country in the commerce of Los Angeles Harbour is England, followed, in order, by the Phillippines, Canada, China, Australia, Germany, and the Dutch East Indies.

From a standpoint of exports the relative rank of the more important countries is as follows:—Japan, England, the Phillippines, China, Australia, Canada, Germany, and New Zealand.

In imports, however, there is a very different picture, with Japan still leading, while next in order comes the Phillippines, Dutch East Indies, Straits Settlements, Brazil, Canada, Germany, and England.

Los Angeles as an Oil Port.

Los Angeles is the world's greatest oil exporting port, with annual shipments over 100,000,000 barrels with a value, including petroleum products, of $200,000,000, and bunkering to the extent of over 1,000,000 barrels per month. It has reached this pre-eminent position because of the rapid development of the fields of the Los Angeles basin to peak production in 1923 and because of the maintenance of this production at relatively high levels by discovery of new producing areas and by deeper drilling of older fields. The eighteen basin fields are all tributary to the port by pipe line, and two trunk pipe line systems also bring oil to the port from the San Joaquin Valley. Beyond this, the proximity of prolific coastal fields makes relatively inexpensive the transfer of their production by tank ship to refineries in the general port area.

Ten oil companies maintain bulk terminals at the Harbour, used exclusively for the shipment and receiving of petroleum, all of which, with one exception, operate municipally-owned wharves, for which they pay dockage and wharfage.

In all, 24 berths are maintained, are well equipped and have adequate fire protection. The ten terminals have a total loading capacity in excess of 100,000 barrels per hour, which is ample for some years to come.

The great volume of refinable crude oil of high gasoline content locally available has resulted in the construction in Southern California during the past fifteen years of extensive refineries and other petroleum handling and manufacturing plants, many of which are located in close proximity to the Port of Los Angeles. The aggregate capacity of oil refineries in this region is two-thirds the capacity of all refineries in California, and the cracking plants here represent in capacity three-quarters of the total capacity of plants of this type in the State. In no other general locality in the State are there concentrated storage facilities of such volume for the accumulation of crude and refined oils, and nowhere else is there such ample provision for handling petroleum in bulk by pipe line and tank ship.

The markets for California petroleum are primarily on the Pacific Coast and in the Hawaiian Islands, and secondarily on the Atlantic and Gulf coasts and in Europe. It would seem that with potential production now estimated for California, the probable potentials of the fields directly tributary to the Port of Los Angeles, the fact that so large a proportion of the available refining facilities of the State are concentrated in the general vicinity of the Harbour, and the ample provision now made for handling oil in bulk, the port will for many years to come enjoy a considerable commerce in petroleum.

Warehouses.

Warehouse No 1, located on Pier 1 in the Outer Harbour, is a Class A reinforced concrete structure of six stories and basement, with a floor area of approximately 477,550 sq. ft. It is divided into 72 rooms, the divisions of the second to sixth floors being somewhat larger than those of the first floor and basement, and each of these is equipped with automatic sprinklers. Such construction and protection makes extremely low insurance rates possible.

Through the building from north to south, there runs an arcade over railroad tracks, where 24 cars can be loaded or unloaded regardless of weather conditions; and four freight elevators, with a capacity of three tons each, connect the arcade with the various floors so that freight can be easily and quickly transferred from car to assigned room.

In addition to these lifting facilities there are 16 whip hoists, eight along the east side of the building and eight on the west, having a capacity of one ton and a loading speed of about 30 tons per hour; and since the warehouse is directly opposite Berths 59 and 60, goods can be taken from trucks at ship's side directly to assigned room in warehouse.

An area of 80,000 sq. ft. in the warehouse is set aside as a U.S. Customs Bonded Warehouse, where someone is on duty at all times, facilitating the handling of foreign cargo or transhipments; and negotiable or non-negotiable warehouse receipts are issued on goods stored in the warehouse when requested by customers.

Warehouse No. 2 is immediately north of Warehouse No. 1, and is a one-storey building with about 75,000 sq. ft. of floor space divided into two sections, each of which is protected by automatic fire sprinklers. It is an ideal place for the storage of heavy merchandise, since it is served with three tracks on the west side and one on the east by the Harbour Belt Line Railroad, which is the line also serving Warehouse No. 1.

Dry Docks and Shipbuilding.

The Los Angeles Shipbuilding and Dry Dock Corporation has a large and completely equipped shipbuilding and ship repair plant in the West Basin. This plant consists of well-equipped building slips for new construction, and fitting-out wharves for ships undergoing repairs; and is also provided with a large machine shop, structural shop, sheet metal shop, electrical shop, pipe and copper shop, blacksmith shop, pattern shop and joiner shop, and has facilities for the construction and repair of steel or wooden vessels of any kind or size. This plant operates a floating dry-dock which has a lifting capacity of 12,000 tons, and also has marine railways for handling smaller craft. The plant is also equipped with shear legs having a lifting capacity of 80 tons, and these shear legs are available for handling heavy cargo shipment from incoming vessels to cars.

The Bethlehem Shipbuilding Corporation at San Pedro is ideally located on Terminal Island at the entrance to Los Angeles Harbour, making it possible for the largest vessel to be handled in and out of the plant with safety and dispatch.

The San Pedro plant is a complete unit and maintains the same high standard of service for which the Bethlehem organisation is noted throughout the entire shipping world. It is equipped to build, recondition and repair all sizes and types of vessels, including tugs, yachts, barges, etc., and its floating dry dock is the largest on the Pacific Coast, having a lifting capacity of 15,000 tons. This plant is approximately thirty-seven acres in extent.

Parkeston Quay Extension *(continued from page 354)*

Strengthening to Old Viaduct.

When the passenger road leaves the shed platform it crosses the old approach viaduct on to filled ground on the far side. The old viaduct was insufficient to carry the new loading, and the area of it under the passenger road was strengthened by heavily reinforced beams underpinning the existing beams, and carried on fourteen 14 in. by 14 in. concrete piles. Since the approach viaduct carried all the tracks giving access to the West end of the existing quay, possession could be obtained for only a week. Actually five days sufficed to take up the permanent way, cut holes through the decking for driving the

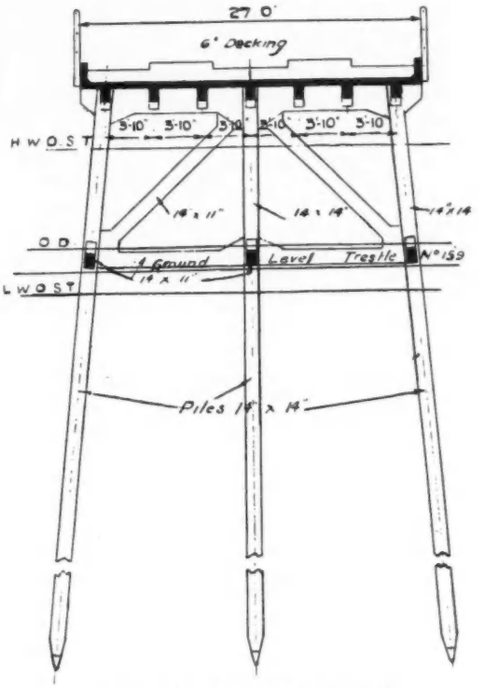


Fig. B. Cross Section, North Viaduct.

piles, drive the piles, place pre-cast cover slabs over the holes, and reinstate the tracks. The concreting of the strengthening beams was then put in hand, in a very restricted space at the toe of the tipped bank, with barely headroom under the deck slab. The beams were concreted to within 2 in. of the existing beam soffits, and, to permit this, were made in cross-section wider at the top than at the bottom. The actual under-pinning was done with slates in cement mortar.

Capstan and Fairleads on Old Viaduct.

On the old approach viaduct are provided a new capstan and two new fairleads. The seatings for the latter are of the usual type, but bolted to the decking; the capstan seating is a heavy kerb cast in situ and prevented from sliding by dowel-pins grouted into holes cut in the deck slab.

Dolphin.

As a head mooring for the vessel in the end berth of the new quay, a bollard is provided on a reinforced concrete dolphin situated about 100 ft. beyond the West end of the quay and adjacent to the North viaduct. The dolphin (Fig. 7) consists of nine 14 in. by 14 in. piles, both plumb and battered, braced together in all directions and surmounted by a solid reinforced slab, 11 ft. square and 3 ft. thick, to which is bolted a bollard of the L.N.E.R. standard pattern. A short cantilevered gangway gives access to the dolphin from the North viaduct.

Widening behind West Shed.

The widening behind the West shed, 14 ft. 6 in. wide and 450 ft. long, consists of two rows of 14 in. by 14 in. piles extended as columns and braced both in vertical and horizontal planes. At a height of 3 ft. 7 in. above the rails of the siding which runs beside the West shed is a platform for the Customs examination of goods from train-ferry wagons. It consists of a reinforced concrete slab, 4½ in. thick including ¾ in. granolithic finish, supported by 7 in. by 10 in. beams at 5 ft. centres spanning between two 9 in. brick walls built on the widened quay. For a length of 58 ft. at the East end, two more rows of piles increase the width of the widening to 37 ft., in order to accommodate an office and bonded store. The construction of the widening requires no description, except to mention that the platform beams were the only pre-cast structural members in the job, and to refer to the difficulties of excavation for pitching the piles under the bonded store, where there had been a dump for old wire ropes. Fortunately the tangle of ropes offered no obstruction to the driving of the piles, which here were 50 ft. long, being 43 ft. in the rest of the widening.

Concrete.

Over 13,000 cu. yds. of concrete were used in the work, and most of it was mixed in ½ cu. yd. mixers and distributed by hand barrow. The same mix was employed throughout, viz., 7 cu. ft. of gravel to 2 cwt. of cement, with sufficient sand to fill the voids, approximately a 1 : 1.2 : 2.7 mix. The cement used was "Steelcrete," rapid-hardening, supplied by Messrs. Casebourne & Co., of Haverton-Hill-on-Tees. The gravel aggregate was brought in barges from tidal beaches at the mouth of the Stour, and contained a varying proportion of sand. The remaining sand necessary to complete the mix was obtained from pits in the Colchester district. A typical compression test on the concrete shows 5,900 lb./sq. in. at 14 days and 7,900 lb./sq. in. at 12 months.

Tar Painting.

The minimum cover over main bars in the reinforced concrete is 1½ in. (1 in. slabs), but to guard against possible deterioration by sea air and salt water, all the concrete work has been painted two coats of "Nonacil" tar compound from the level of the lower bracings up to and including the slab soffits. Some two-thirds of the application was carried out with the aid of compressed-air paint sprays, brushing by hand being employed for the remainder. The tar coating has the further effect of inhibiting the growth of marine organisms which so quickly stain and disfigure structures in tidal waters.

Main Shed.

The main shed, which stands on the new extension, is of two-storeyed construction and covers an area of 56,800 square feet. The middle part of the lower storey is partitioned off to form a passenger station, equipped with baggage examin-

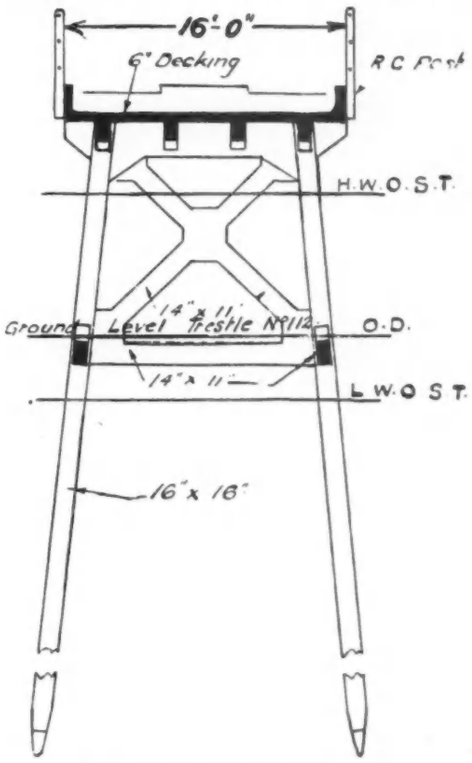


Fig. C. Cross Section, South Viaduct.

ation space, booking office, refreshment room and numerous offices for the Customs and Immigration Officials. The interiors are panelled in wood and in pressed fibre boards, the scheme of decoration being carried out in maroon, cream and white. Collapsible gates are fixed in the entrances from the passenger platform and at the bottom of the ramps which give access to the front of the quay. The remainder of the lower storey is warehouse space, sliding doors at frequent intervals opening on to the platforms. The upper storey is all devoted to warehouse space, with the exception of a short row of offices on the South side. At intervals on the North side (Fig. 2) cantilevered platforms allow of merchandise from ships' holds being landed on them by crane and taken into the interior of the shed through sliding doors. Both storeys have

Parkeston Quay Extension, Harwich—continued

ample Customs lock-up accommodation, partitioned off by screens of light wooden battens laced with galvanised hoop-iron. Six electric lifts communicate between storeys, flights of steel stairs being provided for use when required. The floor of the lower storey is the upper deck of the quay extension. Above this there is 15 ft. head-room to the upper floor, which, designed for 2 cwt. per square foot loading, is constructed as a mesh-reinforced slab 4½ in. thick inclusive of 1 in. granolithic surfacing, and is carried by 10 in. by 4½ in. joists between the main girders, which themselves are carried by three rows of 12-in. by 8-in. compound stanchions at 25 ft. centres, standing on the lower floor. The outer stanchions only are carried up beyond the floor to support the single-span roof trusses of 16 ft. 6 in. rise. The clear head-room under the trusses is 12 ft. 6 in. The roof covering is of asbestos cement tiling, with four continuous strips of wire-reinforced glazing 8 ft. wide. The sides of the shed are covered with black protected corrugated steel sheeting, also provided with ample window space.

Mess Room.

East of the main shed and standing on the lower deck of the quay is a single-storey mess-room of similar construction with accommodation for 200 men. It is equipped with individual lockers, electric cookers and boilers, and is electrically heated, as are all the offices, etc., in the main shed. Incorporated in the structure of the mess-room is a new electricity sub-station with mercury-arc rectifiers, and the necessary transformers and switchgear for dealing with the whole of the power, heating and lighting supply to the extension.

Train Ferry Shed.

The Customs examination shed behind the West shed on the old quay is an open-ended structure, with roof-trusses at 11 ft. centres carried at one end by brackets fixed to the existing shed stanchions and at the other end by an eaves beam supported on stanchions standing on the widened part of the quay. The side and roof coverings are as those of the sheds on the extension, though a certain amount of brickwork has been used in the construction of the Customs office at the East end.

It may be mentioned that the whole of the structural steel-work is of special copper-bearing, rust resisting steel, of which a total of 1,500 tons was required.

Earthwork.

The earth-work for the goods yard extension and for the approach embankment was carried out by the Railway Company direct. Most of the filling was spoil from a new goods yard constructed at Ipswich, 18 miles away, for the 1934 Royal Show. The end of the approach bank embraces the last four trestles of each viaduct, and was tipped to the full length before the viaducts had reached it. This involved some excavation for the construction of the viaducts, which was not really wasteful, as the bank had been given a chance to settle, and the lapse of time between the completion of the viaducts and the laying of the tracks over them on to the bank was reduced to a minimum. The excavations were eventually filled and pitched with coarse broken slag. All slopes exposed to the action of the tide are pitched with pre-cast concrete slabs.

Permanent Way.

All track-laying and ballasting was also carried out by direct labour. All the tracks on the new extension are double-checked, those on the tar-paved portion of necessity, those on the viaducts from considerations of safety. About 3 miles of new track have been laid in the enlarged marshalling yard, while the new works generally have involved extensive alterations to the lay-out and signalling arrangements of the approaches to the yard and to Parkeston Quay Station. The station itself has been partly re-built and two new signal boxes have been provided.

The new works were formally opened to traffic on October 1st, 1934, by Admiral Sir Reginald Tyrwhitt, Commander of the Harwich Force during the War.

The principal contractors were:—For the dredging, Messrs. K. L. Kalis & Co., of London; for the quay extension and widening, including the approach viaducts, The Yorkshire Hennebique Contracting Co., Ltd., of Leeds; for the sheds, Messrs. Geo. Longden & Son, of Sheffield; for the cranes, Messrs. Stothert & Pitt, Ltd., of Bath, and Messrs. Ransomes & Rapier, Ltd., of Ipswich; for the tar-paving, Messrs. Inns & Co., of London.

The whole of the works were carried out to the design and under the supervision of Mr. C. J. Brown, Chief Engineer (Southern Area), London & North Eastern Railway.

THE YORKSHIRE HENNEBIQUE CONTRACTING CO., LTD.

ESTABLISHED IN 1904.

VIADUCT WORKS, KIRKSTALL ROAD, LEEDS.

CONTRACTORS FOR THE REINFORCED CONCRETE JETTY AND APPROACHES, PARKESTON QUAY.

Esplanade at Broughty Ferry for THE DUNDEE CORPORATION.
City Engineer: W. BAXTER, ESQ., M.INST.C.E.

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Notes from the North

Model of Gladstone Dock.

A DELICATE transport operation was successfully performed recently at the offices of the Mersey Docks and Harbour Board, Liverpool, when the electrically-operated model of the Gladstone Dock was loaded for despatch to London.

The model, which is valued at £2,000, has been loaned by the Board to the National Science Museum, West Kensington, London, and a specially-constructed railway wagon was used for its conveyance. The load weighed four tons, and one of the cases measured 15 ft. in length.

Ship Canal Traffic.

Figures of traffic receipts for the month of August, as supplied by the Manchester Ship Canal, were appreciably larger than those of August last year. The total for August was £94,031, which is £1,428 less than that for the previous month, but £5,831 more than that for August last year. Total receipts for the first eight months of this year were £792,415, or £39,916 more than for the corresponding period of 1933.

New Bridge Suggested.

The suggestion has been made that the Mersey Docks and Harbour Board might usefully provide a new bridge across the Liverpool floating bridge and so make a direct lead from the Pier Head to the Prince's Parade. This would be a convenience for people to reach the Isle of Man, Welsh steamers, etc., instead of having to walk around the floating bridge with their luggage.

Wallasey Foreshore.

Wallasey Corporation has received thirteen tenders for the work of constructing the second half of Wallasey Corporation's £1,000,000 scheme for the extension of the New Brighton Promenade. The second half provides for the extension of the promenade from the Red Noses to a point 300 yards beyond Harrison Drive. The proposed work includes about a mile of sea defence wall, the excavation and filling of the reclaimed shore to the promenade formation level, the laying out and construction of roads and gardens, together with all the work incidental thereto.

Manx Harbour Works.

The Isle of Man Harbour Board, in its annual report, states that the Red Pier (Douglas) walls have been extended by 348 ft. at foundation level, and 328 ft. at surface level, and are 45 ft. high. Between the north and south walls 13,222 tons of rubble have been deposited. Of this quantity, 9,922 tons went in during the past twelve months, and in the same period a good half of the walling was erected. The dredging has resulted in the removal of 57,475 cub. yds. of marl, 13,475 yds of rock, 10,000 yds. of silt, and 156 boulders, besides the masonry apron at the head of the old Red Pier; and 1,480 cub. yds. were excavated in preparing the foundations of the extension wall. The Western viaduct is now complete, except for asphalt covering on the carriageway and footways. A commencement has been made on the Southern viaduct, which will adjoin the pier itself.

The strengthening of the Victoria Pier is practically finished. The pier is now 8 ft. wider than it used to be, for a distance of 330 ft. Steamer traffic has gained because the risk of damage to the vessels due to the protruding concrete set-offs in the lower half of the original wall, and the fender piles covering the upper half, has been completely removed; the set-offs are buried in the new work, and the steamers have now a smooth vertical face to lie against. The vital objection to deepening alongside the pier at this position, because of the certainty of undermining the old foundation, has thus been removed, as the steel piles have been driven 12 ft. into the solid clay, and it is possible to deepen by three or four feet without endangering the structure. The stability of the old pier has been ensured by fastening the two side walls securely together by steel tie-rods.

A straight vertical wall now exists at the old pier in Peel instead of one which was very irregular. The pier surface itself is of one level and of a uniform width, with a reinforced concrete deck. In the area adjoining the breakwater, which was dredged in 1914, there has not during the past year been any increase of silt; the process has been effectively stopped.

At the Queen's Pier, Ramsey, the Harbour Board has for many years been replacing pitch-pine timber with greenheart. This work has been finished, and the structure is reported to be in better condition than it has been for many years.

Other jobs which the Board has taken in hand include fairly extensive repairs to the two concrete jetties at Port Soderick; ridding the bed of Laxey Harbour of big stones, and removing some of the accumulation in the Laxey river channel, with the object of giving the weir a freer flow.

Menai Bridge.

Menai Bridge Council has had before it a report from the Pier Sub-Committee which has examined in detail the drawings and specifications of the improvements to the landing stage on St. George's Pier, as submitted by Messrs. Wilton and Bell, consulting engineers. The new level of the stage will be two feet above the present height, and this will make it easier for embarking and leaving boats. Tenders for the work have been invited.

Dock Board Retirement.

Mr. William James Cottrell, an official of the staff of the general manager of the Mersey Docks and Harbour Board, has been presented with a mahogany bureau by the staffs of the Board in recognition of his 49 years' service. He entered the Board's service in 1885, and has served under four general managers. He commenced in the chief accountant's office, and later became Bond book-keeper in the general manager's department. Up to a comparatively short time ago he had never been marked absent, nor had he once been late.

Ribble Dock Undertaking.

On only one occasion in the history of the Ribble Dock undertaking has the gross working surplus exceeded the result of last year's operations, the margin having been £62,991, as compared with £62,451 in 1932-33, and £67,195 in 1926-27. Traffic income rose from £195,598 to £213,373, the total revenue from all sources mounting from £204,155 to £228,519.

The cost of dredging, owing to the dry summer, more than doubled, £25,882 having been spent under this heading. Certain alterations and improvements took £12,313, and the working expenses disclosed an increase of £23,823, against an increased revenue of £24,364. The ultimate deficiency was £21,581, compared with £24,866 in 1932-33.

Within the last twenty years only once (in 1926-27) has there been a smaller deficiency. The amount raised on the rate for Ribble purposes was £29,492, and the credit balance on the revenue account is now £23,474.

Caernarvon Harbour Trust.

That the Caernarvon Harbour Trust should take a lease from the Crown to permit the removal of the sand from the foreshore is suggested by the Board of Trade in a letter to the Trust.

At the last meeting of the Trust it was stated that this course would place the Trust in a position to regulate the use of the foreshore and the bank, and charge royalties for the removal of sand. Experience had proved that leases of the kind had in other places been attended with satisfactory results.

Mr. Trevor Roberts (solicitor to the Trust) said the question was whether a lease would be advantageous to the Trust, seeing that the freehold of the foreshore would still be vested in the Crown. The lease contained a clause relating to the charge to be made on each load removed, in which provision was made for payment to the Crown of a royalty on such receipts. The Crown Regulating Lease, added Mr. Roberts, had been granted to many local authorities in order that they might be in a position to act in the matter in the interest of the public. The Trust already had all they required under their acts, and they held the right on the sand banks so far as the deepening of the channels was concerned. He suggested that the Board of Trade be informed that it was mainly in the interest of the public that they controlled the banks. Instead of asking nominal rents for the leases as was the custom in years gone by, the Board were now asking substantial rents. Even if the Trust decided to ask for a lease, the form of lease now suggested would be inapplicable, because it contained clauses which prohibited the removal of sand without the consent of the Board of Trade.

Mr. John Pritchard said the Trust was responsible for the navigation of the Straits, and it remained to be proved whether the proposed lease would benefit the Trust.

It was decided to leave the matter to the solicitor.

Two Cargoes = 2,690,000 Pieces of Timber.

The Port of London Softwood Season is now at its height. The number of timber ships dealt with in the Surrey Commercial Docks alone since the beginning of June is 245, giving an average of 22 a week. The out-turn of just two boats which recently discharged there accounted for 2,691,662 pieces of timber. Some idea of the vast amount of work which this business entails is shown by the fact that every individual piece of timber has to be sorted to size and stacked by the P.L.A. expert staff of " Deal Porters " and afterwards counted and checked.

The Port of Halifax

Port Traffic during June

Shipping.

DURING the month of June, 1934, a total of 449 vessels entered and cleared the Port of Halifax, as compared to 543 for June, 1933, and 538 for June, 1932.

The net registered tonnage is reported at 498,673 tons, as compared to 507,823 tons for June, 1933, and 563,474 tons for June, 1932.

The number of vessels engaged in the Trans Oceanic service entering and clearing during the month of June, 1934, totalled 126, as compared to 106 for June, 1933, and 120 for June, 1932.

The number of vessels engaged in the Coastwise trade entering and clearing during the month of June, 1934, totalled 323, as compared to 390 for June, 1933, and 408 for June, 1932.

Since January 1st, 1934, the total number of vessels arriving and departing at the Port of Halifax is reported at 2,493, as compared to 2,754 for the same period of 1933, and 2,764 for the first six months of 1932.

Cargo Tonnage.

The total cargo tonnage handled inward and outward during June, 1934, is reported at 132,562 tons, as compared to 109,457 tons for June, 1933, and 124,316 tons for June, 1932.

Since January 1st, 1934, the total cargo tonnage handled inward and outward amounted to 1,107,407 tons, as compared to 750,968 tons for the first six months of 1933, or an increase of 47 per cent.

Passengers and Mail.

The total number of passengers landed and embarked at the Port of Halifax during the month of June, 1934, is reported at 710, as compared to 609 for June, 1933.

Since January 1st, the passenger traffic is reported at 10,605, as compared to 10,559 for 1933.

The quantity of mail handled during the month of June, 1934, is reported at 461 bags, as compared to 241 bags for June, 1933.

Since January 1st, the mail traffic is reported at 74,360 bags, as compared to 67,450 bags for 1933.

Port Traffic during July

Shipping.

During the month of July, 1934, a total of 442 vessels entered and cleared the Port of Halifax, as compared to 548 for July, 1933, and 512 for July, 1932.

The net registered tonnage is reported at 496,521 tons, as compared to 479,671 tons for July, 1933, and 659,904 tons for July, 1932.

The number of vessels engaged in the Trans Oceanic service entering and clearing during the month of July, 1934, is reported at 113, as compared to 129 for July, 1933, and 134 for July, 1932.

The number of vessels engaged in the Coastwise trade entering and clearing during the month of July, 1934, is reported at 329, as compared to 419 for July, 1933, and 378 for July, 1932.

Since January 1st, 1934, the total number of vessels arriving and departing at the Port of Halifax is reported at 2,935, as compared to 3,255 for the same period of 1933, and 3,267 for the first seven months of 1932.

Cargo Tonnage.

The total cargo tonnage handled inward and outward during July, 1934, is reported at 123,723 tons, as compared to 130,315 tons for July, 1933, and 119,288 tons for July, 1932.

Since January 1st, 1934, the total cargo tonnage handled inward and outward amounted to 1,234,708 tons, as compared to 881,283 tons for the first seven months of 1933, or an increase of 40 per cent.

Passengers and Mail.

The total number of passengers landed and embarked at the Port of Halifax during the month of July, 1934, is reported at 3,720, as compared to 4,519 for July, 1933.

Since January 1st, the passenger traffic is reported at 14,325, as compared to 15,078 for 1933.

The quantity of mail handled during the month of July, 1934, is reported at 441 bags, as compared to 203 bags for July, 1933.

Since January 1st, the mail traffic is reported at 74,801 bags, as compared to 67,553 bags for 1933.

Port of London Notes

London's Shipping.

During the week ended August 31st, 1,086 vessels, representing 1,033,786 net register tons, used the Port of London. 525 vessels (833,643 net register tons) were to and from Empire and Foreign Ports, and 561 vessels (200,143 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended September 7th, 1,043 vessels, representing 1,013,764 net register tons, used the Port of London. 527 vessels (837,096 net register tons) were to and from Empire and Foreign Ports, and 516 vessels (176,668 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended September 14th, 1,293 vessels, representing 1,050,908 net register tons, used the Port of London. 547 vessels (833,453 net register tons) were to and from Empire and Foreign Ports, and 746 vessels (217,455 net register tons) were engaged in coastwise traffic.

* * * *

During the week ended September 21st, 986 vessels, representing 1,057,778 net register tons, used the Port of London. 511 vessels (846,785 net register tons) were to and from Empire and Foreign Ports, and 475 vessels (210,993 net register tons) were engaged in coastwise traffic.

Tilbury Passenger Landing Stage.

All records for the P.L.A. Landing Stage at Tilbury were broken during the month of August, when 74 vessels totalling 888,855 gross register tons called at the Stage to embark or disembark 24,608 passengers.

Dock Cruises.

Over 45,000 visitors made the River and Docks Cruise operated by the Port of London Authority during this season, which terminated on Saturday, September 15th.

Immingham Dock Statistics.

During the month of August a total of 121 vessels, representing a net registered tonnage of 173,700, used Immingham Dock, including 17 vessels of 16,417 net registered tons using the Western Jetty coaling berth, and four vessels of 48,391 n.r.t. engaged on passenger cruises, as compared with August, 1933, when 157 vessels, totalling 238,595 net registered tons, used the port, including 32 vessels of 37,407 net registered tons using the Western Jetty, and six vessels of 63,172 n.r.t engaged on passenger cruises.

Smart Handling.

These are days of bustle, but it is doubtful whether anything smarter has been accomplished than in the case of the B. and N. Line's cruising vessel, " Stella Polaris," at Southampton, on September 15th.

She arrived from a Spanish cruise, and her scheduled departure time left her only 2½ hours alongside the quay. Thanks to good organisation, this period proved sufficient for all the necessary details to be carried through.

Steam Turbines to be fitted to "Alcantara."

The departure from Southampton for South America on September 21st of the Royal Mail Lines' motor-ship, " Alcantara," was invested with special interest, for it is the last voyage the vessel will make under Diesel propulsion.

On her return to Southampton on November 6th, she will leave for Belfast, where she is to receive similar treatment to the "Asturias." She will be slightly lengthened and will have her Diesel engines replaced by steam turbines, thus increasing her speed appreciably.

The "Asturias," which has been in the hands of Messrs. Harland and Wolff, Ltd., her builders, for a considerable time, is expected back at Southampton early in October, and she will carry on in the Company's "A" service until the "Alcantara " returns from Belfast next spring.

When both ships are back in commission they will be even more popular with the travelling public, for they will be able to make the voyage between Southampton and Buenos Aires in shorter time, and thus compete on a more level basis with the foreign vessels on that route. Most of them have been faster than the "Asturias " and "Alcantara " have been as motor ships.

Aden Port Trust

The returns of Shipping using the Port of Aden for the month of July, 1934, are as follows:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	133	554,041
,, ,, under 200 tons ...	—	—
Government Vessels	3	4,268
Dhows	40	1,227
PERIM.		
Merchant Vessels over 200 tons ...	23	74,829

The total value of imports, excluding Government Stores, was Rs.35,91,000/-, as compared with Rs.41,55,000/- for July, 1933, and of exports Rs.24,94,000/-, as compared with Rs.27,35,000/-.

The total value of both imports and exports together was Rs.60,85,000/-, as compared with Rs.68,90,000/- for the corresponding month last year.

Imports during the month were above those for July, 1933, in the case of grain, pulse and flour, hardware, raw hides, seeds, white and printed or dyed piece goods, twist and yarn,

TRADE OF THE PORT.

Article.	Unit	Imports.		Exports	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal	Tons	6,179	1,18,266	0	0
Coffee	Cwts.	4,426	1,28,296	8,379	3,06,659
Grain, Pulse and Flour	,,	32,145	1,58,742	21,687	94,311
Gums and Resins	,,	268	4,731	3,069	62,453
Hardware	—	0	19,484	0	24,384
Hides, raw	No.	4,680	2,770	2,242	2,150
Oil, Fuel	Tons	34,120	8,53,000	0	0
,, Kerosene	Gls.	92,056	59,166	4,244	3,020
,, Petrol	,,	49,771	49,092	248	248
Salt	Tons	0	0	15,900	1,69,400
Seeds	Cwts.	3,234	24,879	266	3,893
Skins, raw	No.	438,274	1,74,637	432,100	2,94,189
Sugar	Cwts.	21,312	1,01,974	18,268	89,746
Textiles—					
Piece Goods, Grey	Yds.	2,587,537	3,22,997	2,437,005	3,21,523
,, ,, White	,,	668,811	98,955	381,017	59,999
,, ,, Printed or Dyed	,,	1,132,628	1,83,563	1,127,132	2,28,284
Twist and Yarn	Lbs.	172,280	81,995	174,828	84,068
Tobacco, Unmanufactured ...	,,	297,605	33,986	721,242	1,31,770
,, Manufactured	,,	109,785	66,318	38,382	21,871
Other Articles	No. of Pkges.	47,480	9,54,007	13,830	3,54,973
Treasure, Private	—	0	1,54,653	0	2,41,080
Total ...	—	—	35,91,511	—	24,94,021

The number of merchant vessels over 200 tons that used the Port in July, 1934, was 133, as compared with 124 in the corresponding month last year, and the total tonnage was 554,000, as compared with 504,000.

Excluding coal, salt, fuel oil and Military and Naval Stores and Transhipment Cargo, the total tonnage of imports in the month was 7,100, and of exports 4,700, as compared with 6,800 and 4,000 respectively for the corresponding month last year.

and manufactured tobacco; and below in the case of coffee, gums and resins, raw skins, sugar, grey piece goods, manufactured tobacco, and private treasure.

Exports were above those for July, 1933, in the case of coffee, grain, pulse and flour, gums and resins, seeds, sugar, white and printed or dyed piece goods, twist and yarn; and below in the case of hardware, raw hides, raw skins, grey piece goods, unmanufactured and manufactured tobacco, and private treasure.

Port of Southampton Topics

Docks Statistics for August show Big Increase in Cargo Handled.

A BIG increase in the amount of cargo handled is a feature of the Southampton Docks returns for August. Compared with the figures for August, 1933, there was an increase of 27 per cent. in imports and of 20 per cent. in exports. Cargo handled, both inward and outward, together showed an advance of 25 per cent.

The aggregate increase in the volume of cargo handled amounted to over 15,700 tons. Imports rose from 40,098 tons to 50,999 tons, while exports increased from 25,636 tons to 30,474 tons.

Another bright side to the statistics was in relation to passenger business. In view of the state of affairs on the North Atlantic, it is rather surprising to find that 3,453 more travellers left Southampton during August than in the corresponding month last year. The outward figure was 58,583, as against 55,130, and the inward figure was 52,762, as compared with 51,935.

The number of vessels inward during the month fell from 325 in August, 1933, to 317, and the outward total from 325 to 321. The tonnage losses were not heavy. The inward gross figure was only 31,771 tons short, and the outward returns 53,277 tons down. The tonnage inward amounted to 1,855,312 tons, as against 1,887,083, and outward to 1,846,656 tons, as against 1,899,933.

The net tonnage inward reached 953,043 tons, which was 28,737 tons lower than the total for August of last year, when the figure was 981,780. The outward return was down by 35,617 tons, the total being 945,479 tons, as compared with 981,096.

Cunard and White Star Lines Winter Service.

For several years the express ships of the Cunard and White Star Lines have been operated each winter on a joint service between Southampton and New York. The scheme was found to be not only very convenient when the big vessels were being withdrawn, one or two at a time, for the purpose of annual overhaul, but it was a means of economising when passenger traffic on the North Atlantic was at its lowest ebb.

During the coming winter the same method will be followed, although now, of course, since the merging of the Cunard and White Star Lines, it will not be a case of two companies operating the service.

After the departure of the " Berengaria " from Southampton on September 29th, there will be no more Saturday express sailings until next spring.

Wednesday will be the departure day for the merger company's express ships from Southampton, and the sailing list issued shows that up to mid-December there is not one vacant Wednesday. In the past there has sometimes been criticism of the fact that during some weeks there was no British sailing, so that British mails had to be carried in either American or German liners. Ground for that criticism has thus been removed.

The " Olympic " will be the first of the big ships of the merger company to be withdrawn from service for overhaul this winter. She will remain in port at Southampton from October 12th to November 21st, and on her return to service the "Aquitania " will lay up.

The merger company will maintain a Saturday sailing from Southampton to New York, but this will be undertaken by intermediate vessels making London their terminal. This will not become a weekly service until mid-November.

Mobile Cranes: Various Types and their Uses

MOBILE cranes, operated either by a petrol electric or a diesel-electric system, are now so extensively used in many quarters that a brief history of their development and the uses to which they are put might be of interest.

Fig. 1. Type A. Two-ton Standard Mobile Crane handling Coils of Wire.

One of the earliest types of mobile crane on record is that which was known as the " Dixon " crane. Though this crane was hand-operated and was only capable of handling comparatively small loads, it was a true mobile crane, in that it could be travelled from place to place and, if necessary, travel with its load for short distances. This crane was developed and patented in the early eighties.

Development of mobile cranes did not advance rapidly until the time of the Wembley Exhibition in 1924, when the first petrol-electric mobile crane was exhibited by Messrs. Ransomes and Rapier, Ltd. This excited a good deal of interest, and the crane was subsequently acquired by Messrs. Pickfords, who originally used it extensively for removing the various exhibits from the Wembley Exhibition. After ten years' continuous service, it is still used by them in London.

Subsequently, development was rapid until to-day there are at least four distinct types of petrol or diesel-electric mobile cranes, each of which is illustrated in Fig. 1, and briefly described in the following paragraphs.

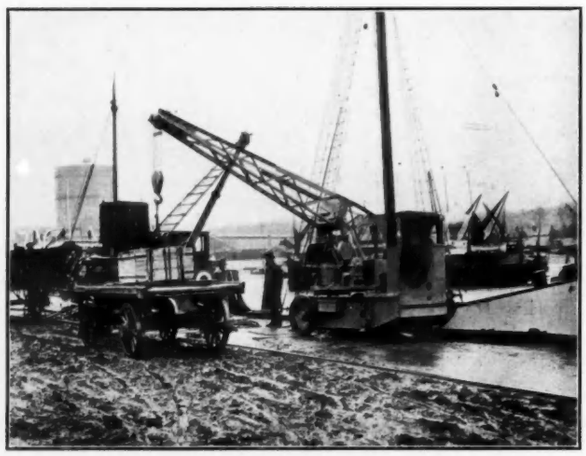

Fig. 1. Type B. Two-ton Standard Mobile Crane operating on Quayside.

Type A.

This crane closely follows the original Wembley model, the main difference being in detail, notably that the man is now seated inside the "A" frame instead of in front of the "A" frame as in the original model. The crane is capable of derricking, hoisting, travelling and slewing about the centre of the front axle, the back axle being in the form of a castor and steered from the driver's position. The slewing motion, therefore, is really the extreme condition of travelling in a circle.

Normal working speeds are 35 to 50 ft. per minute for hoisting and up to six miles per hour for travelling.

Type B.

In this crane the upper structure which carries the hoist and derrick machinery can be slewed through a complete circle independently of the travel motion, and is thereby enabled to operate in very restricted spaces. The crane has derricking, hoisting, travelling and slewing motions, and the castor steering arrangement is similar to the previous crane.

The normal working speeds are approximately the same as for the type "A" cranes.

Each of the foregoing cranes are made in sizes capable of handling loads of 1, 2, $3\frac{1}{2}$/5 or 6 tons.

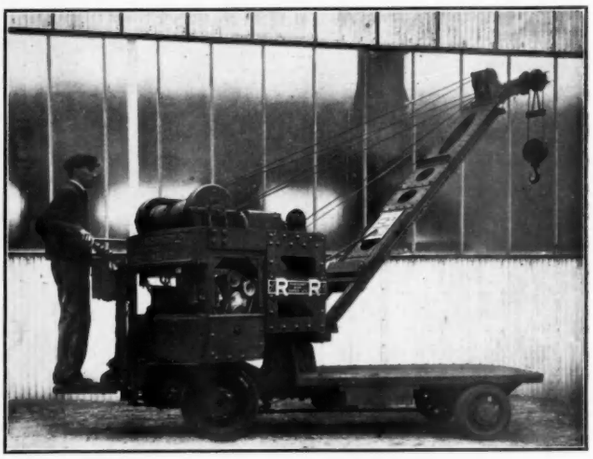

Fig. 1. Type C. One-ton Truck-type Mobile Crane.

Type C.

This crane is well described as the Truck-type Mobile Crane, for it will be seen that it has a large capacity platform on which loads can be carried. Doorways of very limited height can be negotiated as the jib of the crane can be lowered right down. The motions of this crane are derricking, hoisting, travelling and slewing of the upper structure through 270 degrees.

This type of crane is normally made in one size only, and is capable of handling one ton at a hoisting speed of about 30 ft. per minute. The travelling speed is up to six miles per hour.

Fig. 1. Type D. A $3\frac{1}{2}$-ton Lorry Crane with driver in operating position.

Type D.

The lorry crane explains itself, in that it is a crane mounted on a standard lorry chassis capable of being travelled anywhere where an ordinary lorry can go. Travelling speed is limited only by the capacity of the engine, and the police regulations enforced in the country where it is operating. The crane portion can be operated either from the driver's seat in the cabin of the lorry or from the seat on the revolving portion of the crane, in which position the operator has a full view of the load no matter where it may be. This crane is capable of travelling, derricking,

Mobile Cranes: Various Types and their Uses—continued

hoisting and slewing. Hoisting speeds of 35 to 50 ft. per minute are obtained.

The advantages of mobile cranes are obviously many, but it might not be out of place to draw attention to a few of them.

The cranes are mounted on rubber tyres and are not limited to a definite track; they can all travel on ground which is firm and on which an ordinary lorry can be driven.

The prime mover being an internal combustion engine either of the petrol or diesel type means that the crane can be started at a moment's notice when required for duty, and no delays are caused through waiting, as in the case of steam cranes. The electric part of the system ensures that all motions can be accurately controlled by the operator, so that the crane can be used where the most careful handling and placing are necessary.

Two noteworthy applications of mobile cranes for special purposes are shown in Figs. 2 and 3. The attachment of the shovel, in Fig. 2, has proved very successful in many installations for the handling of coke, coal or sand from stock piles. The application of the grab shown in Fig. 3, facilitates the handling of bulk materials, and is widely used on quays and wharves for unloading barges and lighters.

The users of mobile cranes are armies, navies, air forces, railway companies, dock and harbour authorities, shipyards, municipal authorities, contractors, engineering works, general industries and, in fact, all who have lifting and handling to be carried out.

The general utility of mobile cranes make them particularly applicable to docks and harbour service and mobile cranes are

Fig. 2. A 3½-ton Mobile Crane fitted with Shovel attachment for Digging Coke.

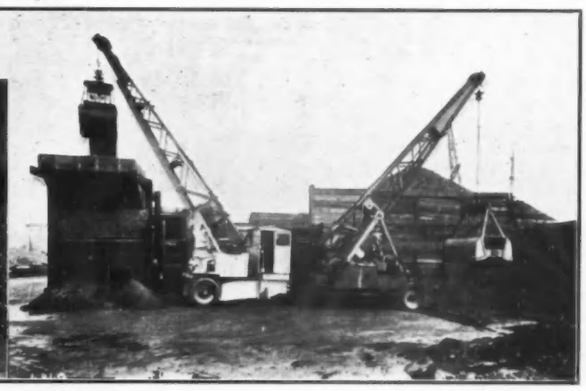

Fig. 3. A 3½-ton Standard Crane and 3½-ton Super Mobile Crane grabbing Coal at Shoreham.

The complete petrol electric system has separate motor drives for each motion, thereby ensuring prompt and easy operation.

The crane motions are fast and complete speed control is obtained by the engine accelerator. With the engine running at a normal "ticking-over" speed the desired motion is switched in. The motion is then started up by accelerating the engine, and the crane speed is regulated by the speed of the engine.

It should be noted that solenoid brakes are fitted on the derricking and hoisting motions so that if, for any reasons, the internal combustion engine should stop, or the current otherwise fail, the brakes come into operation and the load is held in whatever position it may be, thus avoiding damage by sudden lowering.

Another advantage is that the mobile crane being unconfined in its radius of activity, use can be made of ground not covered by other types of crane, and where a sudden demand for storage arises, ground not normally used for such purpose can be taken in and usefully employed.

The uses to which mobile cranes can be put are manifold, and there is hardly a country in the world in which mobile cranes are not in operation.

in daily use in the following ports in the United Kingdom and the Irish Free State:—Birkenhead, Bristol, Cork, Devonport, Dublin, Glasgow, Ipswich, Leith, Liverpool, London, Plymouth, Portsmouth.

Abroad, some of the most interesting applications are at the following ports:—Adelaide, Algiers, Athens, Auckland, Barcelona, Bombay, Calcutta, Capetown, Casablanca, Copenhagen, Dunkirk, Durban, Fremantle, Lorenco Marques, Madras, Marseilles, Montreal, Singapore, Stockholm, Sydney, Wellington.

Mobile cranes are of use not only where goods are handled by ship's derrick on to the quayside, but in cases where dockside cranes are already installed, the mobile cranes being used to supplement the activities of the larger cranes and to travel in and out of warehouses carrying loads which would otherwise not be easily handled.

Between cargo handling on the quay, loading or storage work in the warehouses and lending a hand on heavy repair or installation jobs, mobile cranes can always be kept busy and, despite the many duties, they are in no way makeshift tools as whatever the job, first-class cranage is obtained.

Weser River Inland Shipping in June

In the month of June the low-water level which commenced in April continued, so that freights carried had to be reduced still further. Compared with the previous month, there was a decrease in the water level on the Upper Weser from Hannover-Munden from 1.06 metre to 0.97 metre, and on the Middle Weser from Minden from 1.30 metre to 1.11 metre. (Here the level sank still further by the middle of July to 1.09 metre). Each barge passing from the canal into the Weser had to distribute its cargo amongst three vessels. June water conditions this year are the worst since the War and, probably, since a far longer period.

During the first six months in 1934 the water level of the Upper Weser permitted normal cargoes on 15 days only, and on the Middle Weser on 37 days, against 36 and 55 days respectively in the same period of last year. On neither stretch in the current year since March was it possible to carry a full cargo on any single day.

Traffic through the Bremen Weser Lock in June amounted to 124,000 tons, a slight decrease, compared with May, of 1,600 tons, or 1 per cent. The figures for June, 1933, were also not quite reached. The decrease, however, was only in down-stream traffic, which, at 80,800 tons was 3,400 tons, or 4 per cent. less; and falls to gravel and stones, coal and cement. Only potash salts increased. The quantity of goods carried upstream increased at 43,000 tons, by 1,800 tons, or 4 per cent., and fell to piece goods, grain, scrap and flour. Import coals and timber, on the other hand, decreased. Compared with June, 1933, there was a decrease in traffic downstream in coals, gravel and stone transports of 11,200 tons, or 12 per cent., whilst upstream 10,900 tons more were transported, chiefly piece goods and grain.

During the first half year, 1934, altogether 760,000 tons were carried in both directions, compared with 651,500 tons in the similar period of 1933. The increase by 108,500 tons, or 17 per cent., took place in the first quarter only, however, and amounted to 115,900 tons, or 40 per cent. With the commencement of the unfavourable water conditions in April this was reduced by more than half per cent. Goods carried downstream in the months of January to June inclusive were 540,500 tons, equal to 66,700 tons, or 14 per cent. more, and upstream 219,800 tons, equal to 42,100 tons, or 24 per cent. more.

Organisation of Shipowners in East Frisia and Oldenburg.

The organisation of ship-owners in inland shipping in the districts of East Frisia, Oldenburg, and the northen Ems districts (Papenburg) is about to take place, and the administrator of local works' associations ("Ortsbetriebsgemeinschaftswalter") for the Reichs working association "Traffic and Public Works" in Leer (East Frisia) has been appointed by the President of the Reichs Committee of German inland shipping to speed up the necessary arrangements. In this connection it is expected that freights will also be revised.

Clyde Navigation Trust

Important Development in South African Trade

A DEVELOPMENT of considerable importance both to the Clyde and South Africa is taking place with the arrangements which have been finalised whereby for the first time an itinerary of refrigerated ships has been arranged, bringing regular supplies of fruit from South Africa to the Clyde. Hitherto this trade has been almost entirely concentrated upon London with distribution from Southampton, and for the past four years Mr. Harold M. Ford, the Commercial Manager of the Clyde Trust, has concentrated his efforts upon establishing a portion of this trade in Scotland.

Following upon representations, in which the High Commissioner for South Africa, Mr. C. T. te Water, co-operated, a special mission visited Glasgow under the Chairmanship of Mr. L. C. le Roux, the Chairman of the South African Perishable Products Board, last year. As a result of their investigations, negotiations were opened up with the Union Castle Co., the South African Citrus Exchange, and others interested with a view to developing the Scottish markets by direct supplies of fruit to the port instead of supplies having to be drawn from Southampton. The whole question has been kept repeatedly in front of the growers and producing interests of South Africa, and was the subject of debate in the South African Parliament this last Spring. The first vessel to arrive this year in Glasgow with a cargo of citrus fruit was the s.s. "Millais," under charter to the Union Castle Co., and, to celebrate the opening of this itinerary and the new development of trade, the High Commissioner, Mr. C. T. te Water, accompanied by Mr. B. W. Harlow, the Overseas Representative of the South African Citrus Exchange, and Mr. W. A. Horrocks, the Acting Trade Commissioner, paid a special visit last month to Glasgow.

The visitors were entertained to lunch by the Lord Provost, Mr. A. B. Swan, and subsequently by the Clyde Trust and Sir Steven Bilsland.

The Lord Provost, in proposing the health of Mr. te Water at the luncheon in the City Chambers, said that he had no different story to tell Mr. te Water from that which he told on the occasion when he was last in Glasgow—that Glasgow was the biggest fruit-consuming community in Britain per head of the population, and that it had every facility for the distribution of South Africa's wealth of goods. This week they would have the first direct shipment to the Clyde from South Africa. That introduced a new era for Glasgow, and they knew they had not entered upon that without strenuous opposition from interested parties in the South. They knew that Southampton and the Southern Railway were both very interested in ships from the Colonies, but he was not concerned with middlemen in any way in the distribution of goods. The two sections of people about whom he was concerned were those who produced and those who consumed.

They recognised that South Africa was one of Britain's best customers, and, if she was to be a still better customer in Scotland, they must support her more, so that more people could be engaged in the production of South African goods and more money would be available to buy the manufactured products of Scotland.

Mr. te Water, in responding, paid a tribute at the outset to the enthusiasm which Mr. Harold M. Ford, commercial manager to the Clyde Navigation Trust, had displayed on all occasions in matters affecting reciprocal trade between Scotland and South Africa. He and Mr. Ford had been working for the past four years in the closest co-operation with the object of opening up and developing a direct trade between Glasgow and South Africa by direct shipment to the port instead of attempting to do so through the port of Southampton situated at the other end of the country and representing a heavy charge on their commodities before they reached this market. He was a complete believer in direct trade by direct shipment and that day they stood upon the threshhold of a consummation in that direction, for within 48 hours the first shipload of the programme of direct shipment would have reached the port of Glasgow.

Mr. te Water also mentioned that fresh fruit was not the only commodity which South Africa produced, and he felt sure that with the continued co-operation of the Clyde Trust, through their Commercial Department, it would not be long before they witnessed a material development of trade in other commodities, such as canned fruits, dried fruits, maize, tobacco, wines, etc.

Speaking of Britain's export trade to South Africa, Mr. te Water said that "Great Britain bought raw products from South Africa to the value of about £8,000,000, or £9,000,000 per annum. That represented only about 40 per cent. of South Africa's total production, so that they would see that there was an immense margin for improvement.

" On the other hand, during the year 1933-1934 South Africa bought nearly £24,000,000 of manufactured goods from Britain, and achieved the extraordinary position for a small country of being the second most valuable customer of Great Britain in the world. South Africa, with a population of 2,000,000 white people, was able to purchase very nearly as much from Britain as India with a population of about 350,000,000.

" It is indeed becoming dangerous. If we are not able to sell more goods to you than we have in the past we will have to look abroad.

" So difficult has the situation become that my Government has embarked upon a policy of trade expansion in foreign countries. This year we are establishing some five or six new Legations in Continental countries, with the object of trying to find a market for those surplus goods which you are not able to take from us. In every country we have met with the same answer, ' Yes, we are prepared to take your goods on one condition—that you will buy manufactured goods from us.'

" Every pound's worth of goods which we in future purchase from foreign countries will be at your expense, so I am wandering around Britain trying to persuade you Britons to buy more from us, and so save us from a situation which will be embarrassing to us and disadvantageous to you and to the great Commonwealth of people to which we belong.

" The immediate situation in Glasgow is that this year we have purchased from you something like £500,000 worth of manufactured goods, and I do not think your area has purchased more than a few thousand pounds' worth of South African goods. I make that statement merely to awaken you to a situation which is a mutual one. We wish to be good customers of yours and you to be good customers of ours."

Mr. te Water concluded by observing that at present fifty-two engines were being built at the North British Locomotive Works in Glasgow for South African railways. He was happy to say that there was another order of considerable size in the market, and he hoped Glasgow would provide successful tenderers.

Interviewed by our representative on this new development, Mr. Ford, the Commercial Manager of the Clyde Trust, said that already some South African shipments had been received with excellent results. The contention which has been made hitherto regarding the possibilities of the Glasgow market have been more than fully borne out by the fact that not only has the fruit sold at prices equal to if not better than the other markets of the country, but each shipment has been rapidly disposed of, and could easily have been doubled in quantity. Gradually, I am convinced the producers of South Africa will realise the folly of wasting 2s. per case in attempting to feed our markets from Southampton, and will appreciate, as those in authority already do, not only the advantages of economic supply but the enormous possibilities which are thus opened up for a great development in Scotland of is trade.

Clyde Trust's Annual Accounts.

After two or three depressing years the Clyde Trust were at their Annual Meeting able to report an increase in their trade and revenue. The revenue for the past year was £796,935, against £733,721 the previous year, representing an increase of £63,213.

During the year the total net registered tonnage of vessels entering and leaving the port was 13,017,968, an increase over the previous year of 956,743 tons; while the tonnage of goods, imported and exported, was 6,116,452, an increase of 799,387 tons over the previous year.

Speaking at the Annual Dinner of the Clyde Trust, the Chairman, Mr. W. F. Robertson, referred to the fact that for 10 or 11 years the Trust's revenue had continued fairly steadily at the substantial sum of £1,000,000 per annum, but that by June, 1931, it fell steeply and continued to fall for a further two years. Despite these depressing conditions, the Trust had continued to give attention to every aspect of their affairs and had continued substantially the reconstruction of their quays and improvement of the harbour generally.

He referred to the efforts which the Trust is making to foster trade between the Dominions and Colonies, and expressed his appreciation of the keen interest which was being displayed in this direction by the Lord Provost of Glasgow.

Clyde Navigation Trust—continued

Referring to the launch of the new Cunarder, the Chairman said that out of the confusion and dislocation of world affairs caused by the war, Clyde still remains the cradle of great ships, and he hoped that this great work of national pride represented in this line may prove a successful one in every sense.

In proposing the Toast of the Clyde Trust, Mr. H. M. Cleminson, the general manager of the Chamber of Shipping of the United Kingdom, made some interesting statements regarding the Trust between conditions to-day and those of 1919 or 1913, as represented by the accounts of the Clyde Trust. In the year 1913 dues were paid from no less than 756,900 tons of shipping launched in the Clyde, but in 1933 only 56,368. This demonstrated how dark conditions were in the shipbuilding world of Glasgow.

The figures for cargoes and ships told much the same story and illustrated clearly the need for the steps which had been taken and were being taken to improve the position of shipping. In 1913 nearly 10½ million tons of goods were imported or exported in Glasgow, but in 1934 there were little more than six millions, yet instead of finding a corresponding diminution of tonnage of 13.45, they found that 13½ million tons carried these goods in 1913 and 13.02 in 1934. Thus, while 100 tons of shipping carried 77 tons of cargo in 1913, it had this year carried only 47 tons.

Shipowners of every country to-day were suffering from the excess of supply tonnage over demand. If the deadwood of excess could be cut away expenditure would become profitable once more, shipowners would be able to write off depreciation, their shareholders would again receive dividends and normal shipbuilding would be resumed.

North-East Coast Notes

Timber Trade Record.

IN common with some other timber importing areas, the Tyne has done well of late, and the trade at Tyne Dock, South Shields, has been better this year than for nearly forty years past. In the first six months of this year the timber discharged, excluding pitwood, amounted to 62,725 tons, compared with 47,398 tons in the corresponding period of last year. An examination of the quantities imported since the first six months of 1898, when the total was 26,556 tons, indicates that throughout the thirty-six years there have been no figures comparable to those of the opening six months of the current year. The nearest total was in the first half of 1927—57,783 tons—and the next best was in 1924, with an aggregate of 55,801 tons. Trade has been as low as 7,420 tons recorded in the first six months of 1921.

More Records of Smart Work.

The North-East Coast is well maintaining its reputation for smart work, of which three recent instances stand to be recorded. Two of those are from Blyth. The steamer "Hoogland" (1,650 tons) berthed there at 5 a.m. on August 7th, completed loading at 11.10 a.m., and sailed the same day. She discharged her cargo on the Continent, returned to Blyth, and berthed again at 7.50 a.m. on Saturday, August 11th, finished at 2.50 p.m., and sailed the same day. The vessel thus loaded at Blyth twice in five days.

* * * *

A record has also been created at Blyth for the unloading of pit props in the harbour. The Swedish vessel "Norna," which arrived at the South Harbour from Kristineham, Sweden, with 499.715 standards of pit props for the firm of Atkinson, Glover, Burnip and Co., Ltd., of Newcastle, Sunderland, and Blyth, commenced unloading at 8 a.m. on August 13th. The Commissioners' three electric cranes were set to work and unloaded the cargo by 10.15 a.m. next day. The unloading represents a discharge by the three cranes of 417 standards per working day of eight hours and of 34.76 loads or tons per crane hour.

* * * *

An instance of smart despatch is reported from Dunston. The steamer "Skeldergate" commenced loading at 7.20 p.m. on August 30th, and finished at 10.30 a.m. on September 1st, having loaded about 8,000 tons of cargo and bunkers. The net loading time was about 35 hours.

Swan & Hunter's New Dock.

Messrs. Swan Hunter and Wigham Richardson have made an important addition to their graving docks by the construction of a third one, parallel to the two existing docks. The construction of the new dock was entrusted to Sir Robert McAlpine and Sons, of London, Glasgow, Liverpool and Newcastle. The dock, which is Messrs. Swan and Hunters No. 3, is larger than either of the two older docks. Its dimensions are 570 ft. in length, 80 ft. wide at entrance and with a depth of 26 ft. over the sill. Between No. 3 dock and the next dock there is a width of 35 ft., giving room for three lines of railways and a fifty-ton electric travelling crane. Messrs. McAlpine began this undertaking in February last year, and the dock is now practically finished. The pump house, with a suction chamber underneath, lies between the east wall of the new dock and the west of No. 1 dock near the entrance. In the construction of it the concrete has been reinforced with steel rails and bars. The pumping machinery has been supplied by Messrs. Drysdale and Co., of Glasgow. There are two electrically-driven centrifugal pumps of a total capacity of 70,000 gallons per minute, capable of emptying the dock in two hours with no ship in the dock.

Wear's Increased Trade.

It was reported to the River Wear Commissioners at their meeting in August that coal shipments from Sunderland for the six months ended June had increased by 74,199 tons, compared with the corresponding period of last year. Increases were also reported in the general goods trade of the port, imports by 18,944 tons and exports by 4,035 tons. July trade was poor, however, and for the seven months the shipments were 2,342,005 tons, compared with 2,296,544 tons last year. Other exports totalled 30,636 tons, compared with 26,483 tons last year. Imports for the seven months totalled 182,735 tons, against 163,757 tons in 1933. The report of the Works Committee stated that with respect to No. 11 berth reconstruction, the building of the quay had been completed with the exception of the filling behind the wall, about 1,300 tons of which had been tipped during the month. During the progress of the work it was necessary to remove more ground than had been anticipated, and this meant additional filling at an extra cost of £600.

Personalia.

Mr. C. E. Baldwin, General Manager and Secretary of the Blyth Harbour Commission, has been presented by the staff with a gift to mark his completion of 25 years' service. Mr. Baldwin was appointed in 1909, when he was District Superintendent at Newcastle for the North-Eastern Railway. Some time ago Mr. Baldwin was awarded the gold medal of the Institute of Transport for a paper on the lay-out and equipment of quayside railways and transit shed works.

* * * *

Mr. H. J. Moscrip, assistant general manager, under the Tyne Improvement Commission, has retired on superannuation, having reached the age limit. He has been in the service of the Port Authority for 34 years, and has long been recognised as one of its most capable officials. He was a representative of the North-East on the Council of the National Council of Port Labour Employers.

Weser River Inland Shipping in July

During July water conditions on the Weser continued to be bad. It was possible to maintain traffic of barges on the Upper Weser through drawing on the Eder reservoir; however, this reservoir is nearly empty, and it must be expected that supplies from this source will cease at the end of July, or during the first days of August.

A total of 120,500 tons passed through the Bremen Weser Lock in July. This was a reduction, as compared with the previous month of 3,500 tons, or 3 per cent., and as compared with July, 1933, of 18,000 tons, or 13 per cent. due, in part, to the low-water conditions. Compared with the previous month, however, only upstream traffic has decreased. This total of 33,800 tons shows a decrease by 9,400 tons, or 22 per cent., principally due to smaller shipments of piece-goods, grain and scrap iron. Downstream, on the other hand, 86,700 tons were carried, being an increase of 5,900 tons, or 7 per cent., chiefly due to larger potash transport. Coal, gravel and stones also showed increases, though inconsiderable.

During the months January-July, 1934, a total of 880,800 tons was carried, as against 789,900 tons in the same period of the previous year.

Italian Harbour Affairs

Statistics for shipping at Italian ports during the first six months of 1934 were as follows:—

		ARRIVALS and CLEARANCES				
	Jan.-June	No.	N.R.T.	Goods unloaded (Tons)	Goods loaded (Tons)
Savona ...	1934	2,019	1,717,348	874,965	167,081
	1933	1,609	1,460,476	717,576	138,343
Genoa ...	1934	6,343	10,647,596	2,872,707	541,199
	1933	5,779	9,752,279	2,614,859	565,455
Leghorn ...	1934	3,900	3,980,153	661,014	168,290
	1933	3,747	3,785,908	567,909	193.228
Civitavecchia	1934	1,622	2,065,560	537,097	85,036
	1933	1,566	1,956,652	382,191	63,720
Naples ...	1934	8,939	10,933,915	764,498	131,998
	1933	9,961	9,330,930	714,561	136,225
Brindisi ...	1934	1,161	2,507,880	61,411	9,051
	1933	1,413	2,515,886	67,332	13,293
Bari ...	1931	1,855	1,711,819	171,037	19,354
	1933	1,644	1,558,724	108,985	22,748
Ancona ...	1934	2,501	1,462,337	298,979	30,914
	1933	2,178	1,406,875	130,644	54,887
Venice ...	1934	4,161	4,909,764	1,429,213	216,069
	1933	3,780	4,564,096	1,070,622	246,182
Trieste ...	1934	15,835	5,264,210	868,555	342,784
	1933	15,666	5,118,712	690,722	251,588
Fiume ...	1934	5,192	1,965,332	152,116	130,495
	1933	5,341	1,900,732	178,463	77,652
Messina ...	1934	3,417	2,230,309	139.575	62,118
	1933	3,336	2,130,725	133,090	60,350
Catania ...	1934	3,013	2,041,492	211,186	94,318
	1933	2,363	1,940,236	191,434	104,870
Syracuse ...	1934	1,739	1,468,287	35,151	31,518
	1933	1,609	1,436,531	42,908	29,749
Palermo ...	1934	5,266	3,759,032	269,253	95,370
	1933	3,403	3,430,671	226,886	93,535
Cagliari ...	1934	1,382	925,520	168,928	165,526
	1933	1,280	868,953	115,202	171,350

It should be considered that the total increase in Italian shipping as a whole has not been equally distributed among Italian ports. At the largest Italian ports there has been an increase in imports and a decrease in exports, with the exception of Trieste, where both imports and exports have increased. At Messina and Palermo there has been a progress in shipping as a whole. The progress in shipping at Italian ports is of a permanent character, as the preliminary figures for July, 1934, have shown an increase in respect to the figures for the corresponding period of 1933.

The figures regarding the main items of imports at leading Italian ports during the first six months of 1934, compared with the figures for the corresponding period of 1933, are as follows:

	COAL		CEREALS		COTTON	
	1934 Tons	1933 Tons	1934 Tons	1933 Tons	1934 Tons	1933 Tons
Genoa ...	1,229,864	1,094,298	192,335	169,482	57,903	91,798
Savona ...	715,282	506,133	2,430	377	333	233
Leghorn ...	388,167	339 027	27,916	20,375	849	1,566
Civitavecchia	371,541	249,363	999	6 645	—	—
Naples ...	332,949	392,300	47,974	56,902	3,468	3,336
Palermo ...	110,701	71,331	228	160	—	—
Catania ...	32,561	46,143	5,663	11,305	—	—
Trieste* ...	145,388	125,901	11,577	53,755	25,758	11,101
Venice ...	706,964	407,500	49,648	34,838	31,484	22,605
Fiume ...	12,271	8,473	1,728	24,322	2,589	1,610
Ancona ...	150,820	75,396	6,487	2,079	—	3
Bari ...	50,853	38,658	1,719	15,223	—	1
La Spezia ...	214,510	163,510	80	—	—	—
Brindisi ...	11,861	6,738	13,480	10,694	36	—
Messina ...	38,894	31,368	11,201	8,340	—	—

*January-April, 1934, only.

The progress in Italian shipping as a whole is due to larger imports of coal and cereals, but an exception has been made in Naples where, though the quantity of coal and cereals unloaded has decreased, there has been an increase in imports, which is evidently due to a larger quantity of general cargo arrived. This is undoubtedly due to the activities of the Azienda dei Mezzi Meccanici e degli Arredamenti Portuali del Porto di Napoli, which has taken every possible step to ensure rapidity in unloading and loading. In this connection it may be noted that the Executive Committee of the Port of Naples Authorities has just approved a project regarding the construction of three new large concrete warehouses on the first pier of the Littorio Dock, which is to be served by two 5-ton electric cranes, and where the lumber trade is to be transferred from the Molo Cesario Console.

In connection with the construction of the maritime passenger station in the Port of Naples, it may be interesting to note that the total passenger trade at Naples during the first six months of 1934 included 108,281 passengers arrived and cleared, against 93,263 passengers arrived and cleared during the corresponding period of 1933, this being an increase of 15,118 passengers, or 16 per cent.

The Consorzio Autonomo del Porto of Genoa has just decided to go on with the preparation of the project regarding the construction of a fourth dry dock in the Alle Grazie zone, which is to measure 350 metres in length and 40 metres in width, and is to be completed as soon as possible. In view of the successful results obtained by the operation of the three existing dry docks of the S.A. Ente Bacini, the fourth dock is to be entrusted also to this concern. Further, it has been decided to enlarge the Molo Giano and to start the construction of a large concrete warehouse on the second pier of the Mussolini Dock. The two first piers are to be completed during 1935, while the whole Mussolini Dock will be completed by 1939, when the total length of the breakwaters and quays in the Port of Genoa will reach 27,000 metres, of which no less than 18,000 metres will be utilised by shipping. In connection with shipping at Genoa, it may be reported that recently there has been an increase in the unloading of coal, and that no less than 11 ships have been under discharge at the same time. Five of these ships have been able to unload simultaneously 3,000 tons daily each ship.

New Maritime Passenger Station on the Ponte Andrea Doria, Genoa.

The preliminary figures regarding shipping at Trieste during the month of July show an increase of 140,274 tons, or 64.8 per cent., in respect to the corresponding period of 1933. Shipping at Trieste during the first seven months of 1934 is as follows:—

	JANUARY-JULY	
	1934	1933
	CENTALS	
ARRIVALS		
By Rail	3,624,303	2,786,449
By Sea	10,138,120	7,620,746
Total	13,762,423	10,407,195
CLEARANCES		
By Rail	5,048,044	4,103,898
By Sea	3,640,801	2,603,951
Total	8,688,845	6,707,849
TOTAL		
By Rail	8,672,347	6,890,347
By Sea	13,778,921	10,224,697
Total	22,451,268	17,115.044

In connection with the unloading charges at Italian ports, it is understood that in consequence of an agreement, which has been reached between the Italian Government and the dockers a new reduction in tariffs has been made possible.

Profit from Gravel Sales.

Fleetwood Corporation made a net profit last year of £7,401 from the sale of gravel deposited on the southerly end of the beach by the tides. This figure is revealed in the annual abstract of accounts just issued by Mr. H. Smith, the Corporation treasurer. Out of the amount realised, £845 was paid in income tax. Altogether a sum of £11,900 was earned by selling gravel and sand, and the wages paid to workmen amounted to £2,510. Since the Corporation began selling gravel and sand, the profits, which have been devoted to providing foreshore amenities for holiday-makers, have totalled £42,093. Out of this year's net profit contributions amounting to £3,437 have been made to capital works, leaving a balance of £3,964.